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CHESAPEAKE BAY CLEANUP PROGRAM

HEARING

BEFORE THE

SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY
AND THE DISTRICT OF COLUMBIA

OF THE

COMMITTEE ON
GOVERNMENTAL AFFAIRS
UNITED STATES SENATE

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CHESAPEAKE BAY CLEANUP PROGRAM

TUESDAY, JUNE 24, 1986

U.S. SENATE,
SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY
AND THE DISTRICT OF COLUMBIA,
COMMITTEE ON GOVERNMENTAL AFFAIRS,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:30 a.m., in room SR-301, Russell Senate Office Building, Senator Charles McC. Mathias, Jr. (chairman of the subcommittee) presiding.

Present: Senators Mathias, Warner, Heinz, Trible, Specter, and Sarbanes.

Staff present: Monica Healy, legislative assistant to Senator Mathias.

OPENING STATEMENT OF SENATOR MATHIAS

Senator MATHIAS. The Subcommittee on Governmental Efficiency and the District of Columbia will come to order.

We are meeting today to assess the future direction of the Chesapeake Bay Cleanup Program.

The $27 million EPA Chesapeake Bay study released in 1983 sounded the alarm that the Chesapeake Bay was in trouble. However, at the same time, it gave us hope that if we all harness our resources, we can restore the bay to health. It defined the problems of the bay and gave us unique tools to respond to this very large challenge.

The States of Maryland, Virginia, Pennsylvania, and the District of Columbia, the Federal Government and all the users of the bay moved swiftly, aggressively and constructively to respond to this challenge and have put forth what I consider to be impressive and bold initiatives. Last fall, they released a Chesapeake Bay restoration plan which provides a clear, comprehensive statement of objectives to be implemented by this Federal-State partnership.

Everyone involved in the Bay Cleanup Program should be commended for the progress to date, but, as in all major efforts, I think it is necessary from time to time to take a sounding to make sure that we are sailing in the right direction. We have to know where we are, and to make sure we are charting the right course to guide us into the future. I think we have to evaluate the effectiveness of what we have done and determine what more needs to be accomplished. We need to develop specific baywide strategies to attain the goal of restoring the bay to health.

We suffer the same dangers that Odysseus did. We could wind up in either a whirlpool or on the rocks. At the moment we have singled out nutrients as a major problem for the bay. We are harnessing our efforts to solve that particular problem. However, in focusing our attention on nutrients we have to be careful not to lose our perspective on other problems, like toxics, that also require attention.

It is my hope that the hearing today will illuminate where the hazards are in the Chesapeake Bay Cleanup Program so that they can be avoided. At the same time, we hope that we can focus light on the proper course of action to successfully complete the cleanup effort of the Chesapeake Bay.

Senator Heinz.

OPENING STATEMENT OF SENATOR HEINZ

Senator **Heinz**. Mr. Chairman, first, I want to congratulate you for continuing to focus the spotlight of attention on the problems of the Chesapeake Bay and for bringing about this hearing. I think the residents of the Chesapeake Bay area, which certainly include my State particularly as users of the great resources of the bay, owe you a considerable debt of gratitude for your quite remarkable efforts on their behalf.

I am delighted to see Mr. Cook here from the State of Pennsylvania representing our Governor, Dick Thornburgh.

I just want to add that implementation of the Chesapeake Bay agreement is important to Pennsylvanians. It is also a challenge to the Susquehanna River. It is a primary source of both fresh water, on the one hand, and a primary source of agricultural pollutants, on the other hand. So, cleaning up the bay means a cleanup of the Susquehanna River Basin. That is a difficult and challenging problem. It is not so much, I am advised, a question of sewage treatment or manufacturing, as it is agricultural.

To give you some idea, last September, when we had some heavy rains in the State, there were about 100,000 gallons of toxic wastes washed into the Susquehanna River from the Butler Mine Tunnel up near Wilkes-Barre. That was declared such a hazardous situation that the Superfund was triggered a second time to clean up the Butler Mine Tunnel.

Yet, one 200-acre farm along the Susquehanna River can produce more pollutants in a year than that Butler Mine Tunnel reemergence did last year.

I would like, Mr. Chairman, to have the full text of my statement put in the record at this point.

Senator **Mathias**. Without objection, the entire statement will be put into the record at this point.

[Senator Heinz' prepared statement follows:]

Prepared Statement of Senator Heinz

I would like to thank the distinguished chairman of the Subcommittee, Senator Mathias, for his courtesy in including Bay-Area Senators on the panel this morning. All the residents and users of the Chesapeake Bay region owe Senator Mathias a great debt for his tireless efforts on their behalf.

Implementation of the Chesapeake Bay Agreement is important to Pennsylvanians. It is also a challenge. The Susquehanna River is the Bay's primary source of fresh water. It is also its primary source of agricultural pollutants. Cleaning up of the Bay means a clean-up of the Susquehanna Basin.

Clean up of the Susquehanna presents a difficult problem. The chief source of the pollution is not so much sewage treatment or manufacturing as it is agricultural. For example, last September heavy rains washed 100,000 gallons of toxic waste into the Susquehanna from the Butler Mine Tunnel—a Superfund site declared "cleaned up". Yet one 200-acre farm along the Susquehanna can produce more pollutants than that in a year through simple erosion. In reality, it is probably easier to control a toxic waste spill—as disastrous as that is—than to control erosion and overfertilization from the 12,000 farms which lie alongside the Susquehanna River. A full 5.5 tons of soil erodes into the Susquehanna for every acre along the river, every year. As a result, I am advised that Pennsylvania produces nearly half of the Chesapeake Bay's nitrogen through overfertilization and inadequate soil management. One can argue about the best solutions for toxic waste, which kills plant and animal life outright, agricultural runoff which spurs huge algal blooms down river, and soil erosion which smothers all life in its path, but all of these sources of pollution are severely threatening the lower Susquehanna and the Chesapeake Bay with ecological destruction.

I congratulate the Commonwealth on devoting $2 million in 1985 to provide Best Management Practices in selected watersheds along the river. This is an important first step. A lot more, however, is going to be needed very shortly. The President has committed himself to provide $40 million in Federal assistance, and I think we will need at least that much, very soon. I want to strongly urge the Commonwealth of Pennsylvania to redouble its efforts to promote intelligent use of Pennsylvania farm land, and control the devastating erosion of our soil. These efforts must be at the center of our efforts in any Second Phase of the Chesapeake Bay clean up.

Pennsylvania farmers are hard-working and responsible men and women, I know they will respond if they receive adequate support from State and Federal governments. I am pleased to see Mr. Cook, representing Governor Thornburgh here today, and I look forward to working with our Governor to provide the kind of partnership that Pennsylvania is known for. We will be a good neighbor.

Senator **Heinz**. I just want to say that you can, I suppose, argue about what the best solutions are and about who the major contributors to the problem are; but one thing is clear. If you add up the effect of toxic waste which kills plant and animal life outright, agricultural runoff which spawns huge algal blooms downriver, the soil erosion which can smother life in its path outright and if you put all of that together, then what you have got is a very severe threat to both the Lower Susquehanna and the Chesapeake Bay; a threat that poses the real risk of ecological destruction.

I am proud of the efforts to date of the Commonwealth of Pennsylvania. They have devoted some $2 million last year to providing the best management practices in selected watersheds along the river. It is an important first step, and we want to encourage them to continue to do the excellent job to which I know they are committed.

Again, Mr. Chairman, I congratulate you because without the special attention that you individually have given to this issue, I don't know that we would ever have seen the beginnings of the major Federal and multistate initiatives that are taking place today.

Senator **Mathias**. Thank you very much, Senator Heinz.

I appreciate your very generous remarks, but I have to reflect that half of all the fresh water in the bay comes from Pennsylvania so we are particularly happy with your participation here. I think that is a good sign for the future.

Senator Sarbanes.

OPENING STATEMENT OF SENATOR SARBANES

Senator **Sarbanes**. Mr. Chairman, I join my colleagues in commending you for convening this hearing to review the future direction of the bay cleanup effort.

One must say a word about the role you have played over the years in leading this effort since its very inception. In my view we would not be where we are today without your persistent efforts and your strong leadership, and people throughout the bay area are indeed indebted to you, indeed, throughout the country, since the bay program serves as a model for what might be repeated in other parts of the country.

This hearing comes at an opportune time. It has been over a decade since Congress authorized the EPA-Chesapeake Bay Program and nearly 3 years since the EPA's comprehensive study authorized by that legislation was completed.

We have made real progress during that period. The 7-year-$27-million Chesapeake Bay study provided us with an increased understanding and appreciation of the bay and its problems in addition to recommendations as to the course of action Federal, State, and local governments must take in order to clean up the bay.

We have had an unprecedented level of interstate cooperation, as symbolized by the witnesses at the table in front of us, and Federal-State cooperation.

With the signing of the Chesapeake Bay agreement in December 1983, the States of Maryland, Virginia, and Pennsylvania, as well as the District of Columbia, have initiated new programs and are working together toward a common solution.

EPA and other major Federal agencies, in order to coordinate their efforts, have entered into a memorandum of understanding. EPA and the States have developed a Chesapeake Bay restoration and protection plan, and the private sector with citizens' groups, such as the Chesapeake Bay Foundation, have become very much involved.

We need to assure that the progress which has been made thus far is reinforced through the continuation of this cooperative management structure and continued commitment backed by sufficient resources to protect and enhance the quality of the Chesapeake Bay.

This restoration program will involve a continuing, long-term effort before improvements in water quality and living resources are evident. No one should underestimate what has been achieved thus far, but much more needs to be done. The critical thing will be to make certain that the efforts to restore our Nation's greatest estuary is sustained now and in future years, and I am most appreciative to you for this further push that you are giving to this onging effort by these hearings.

Senator MATHIAS. Thank you very much, Senator Sarbanes. Your own participation has been extremely important in this. I think it is, obviously, the work of many hands. I hope it will continue to be so.

Senator Trible.

OPENING STATEMENT OF SENATOR TRIBLE

Senator TRIBLE. Mr. Chairman, thank you very much for this opportunity to take a comprehensive look at the future of the Chesapeake Bay. As President Reagan has said, "The Chesapeake Bay is a special national resource." For those of us who live in Maryland or Virginia and the other jurisdictions so ably represented today, we depend on the Chesapeake Bay for food, jobs, transportation, recreation. It is fundamental to our well-being, and, therefore, it must be fully protected and preserved.

I want to join my colleagues, Mr. Chairman, in recognizing your leadership through the years. The recognition of the unique character of the Chesapeake Bay is, in large measure, a result of your hard work and your leadership, and all of us who deeply care about the bay owe you a great debt of gratitude. Indeed, this whole enterprise of the cleanup of the Chesapeake Bay may well be your most lasting and important legacy.

We are off to a good beginning. We see a concerted bipartisan effort underway to ensure the restored health of this priceless resource. But obviously much more needs to be done. We must, as you have pointed out, establish specific baywide strategies to stem the tide of pollution. We have to tackle the problems of nonpoint source pollution. But also we must establish water quality standards for toxic substances, as well.

I am particularly concerned, Mr. Chairman, about the use of antifouling paints that contain TBT. This, as you well know, is a highly toxic, highly effective antifouling agent that kills barnacles, sea grasses but regrettably could also have a lethal effect on shell fish and other marine species. France, England, Japan, North Carolina have regulated the use of TBT. The Environmental Protection Agency recently began a special review of TBT compounds to determine if indeed they are safe or whether they present unreasonable risks.

I would hope that our States and our Federal Government could respond to this concern decisively and take appropriate action.

Let me say, finally, Mr. Chairman—and I would ask that my full statement be made a part of the record—that the problems we face are real and challenging, but the framework is in place and we can see a strong spirit of commitment and cooperation developing. With decisive leadership in Washington and in our State capitals, we can and we will succeed.

Thank you, Mr. Chairman.

Senator **MATHIAS**. Thank you.

Senator Trible, we appreciate your continuing interest. You are very kind and generous as far as I am concerned, but let me suggest to you that some of the happiest days I have had over the past several decades have been days spent on the Chesapeake Bay. If you can employ your time in that happy and useful way, I think it is one of the best things that Maryland and Virginia Senators can be doing.

Senator **TRIBLE**. I would say to my friend and colleague that now that you hopefully will have more time to spend on the Chesapeake Bay, those of us who remain in Congress must redouble our efforts.

Senator **MATHIAS**. I will see you there.

Senator **SARBANES**. I think he is going to become an admiral of the Chesapeake Bay.

Senator **MATHIAS**. We are fortunate this morning to have as our first panel one of the most distinguished panels that has ever attended a session of a Senate committee. We have the Governor of Maryland, the Honorable Harry Hughes; the Governor of Virginia, the Honorable Gerald Baliles; the Mayor of the District of Columbia, the Honorable Marion Barry; and a representative of Governor Thornburgh of Pennsylvania, Mr. William A. Cook.

It is a great pleasure for the committee to welcome all of you. Each of you brings to the committee this morning a special area of expertise, and we look forward to hearing your testimony.

Let me announce as a general rule for the morning that all statements submitted will be included in full in the record. Witnesses may, if they choose, summarize their statements.

Governor Hughes.

TESTIMONY OF HON. HARRY R. HUGHES, GOVERNOR OF THE STATE OF MARYLAND;[1] HON. GERALD BALILES, GOVERNOR OF THE STATE OF VIRGINIA;[2] HON. MARION BARRY, JR., MAYOR OF THE DISTRICT OF COLUMBIA;[3] AND WILLIAM A. COOK, DEPUTY SECRETARY FOR ADMINISTRATION, PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES, REPRESENTING HON. DICK THORNBURGH, GOVERNOR OF THE STATE OF PENNSYLVANIA[4]

Governor HUGHES. Thank you, Mr. Chairman.

I would like to add my voice to those who have already spoken and express my appreciation and the appreciation of thousands of Marylanders particularly for your efforts and leadership not just recently but over a long period of time, to find out what is wrong with the Chesapeake Bay and to do something about it.

As you say, the submitted testimony will go into the record.

Senator MATHIAS. Yes, without objection, your entire written statement will be inserted into the record.

Governor HUGHES. Mr. Chairman, I would also like your permission to submit for the record our two annual reports, the 1984 and 1985 Maryland reports on the Chesapeake Bay.[5]

Senator MATHIAS. Without objection, they will be included in the record.

Governor HUGHES. We have made a very important beginning on this effort. There is no longer a sense of shared frustration but rather a growing appreciation of our collective promise as we take measure of our efforts to revitalize this national estuary, the Chesapeake Bay.

Let me briefly run over some of the highlights of what we have been doing in Maryland over the last 2½ years. Since the Chesapeake Bay agreement in 1983, we have allocated over $130 million of State funds for this effort in three sessions of the General Assembly. About 70 percent of that is capital; about 30 percent, as I recall, is for operating costs.

In our effort, we have taken a wholistic and ecological approach to restoring the bay. Our bay program has four components: pollution control, resource enhancement, land management, and institution building. Let me highlight a few of these achievements, if I may.

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[1] See p. 51 for Governor Hughes' prepared statement.

[2] See p. 69 for Governor Balilies responses to written questions.

[3] See p. 71 for Mayor Barry's prepared statement and p. 75 for responses to written questions.

[4] See p. 78 for Governor Thornburgh's responses submitted by Mr. DeBenedictis.

[5] See p. 407 and 441 respectively.

We have completed phosphorus removal at 17 treatment plants pursuant to the upper phosphorus policy which was adopted in 1978. I might also add that, as you may know, we were successful in getting legislation through in banning phosphorus in detergents.

By 1988 the total phosphorus from sewage treatment plants entering the bay and its tributaries in Maryland will be reduced by 80 percent. In the Patuxent where nitrogen is of substantial concern over 30 percent of the nitrogen from treatment plants will be removed, and that will be done at a cost of about $30 million. It will be monitored to see what effect that will have on water quality and those things that live in the water since there is some uncertainty about the removal of nitrogen.

Since 1983 enforcement and compliance activities directed against municipal and industrial plants have more than doubled. Not only the efforts but the personnel for those purposes have been more then doubled.

We imposed, as you know, a moratorium on the taking of striped bass to protect the 1982 class which is critical. I am glad to report that there seem to be a lot of striped bass in the bay now, and we hope that they get the chance to go out in the ocean, come back, and spawn in 3 or 4 years. That is why it is so critical that we have limitations on the coastal fishing of these fish.

We have installed best management practices on more than 1,400 agricultural cost-sharing projects. There are more than 1,400 farms utilizing $4 million of State funds for that prupose. We have established what I think is going to be the keystone of this effort—the Critical Areas Commission. Recently, the Maryland General Assembly approved the criteria to guide local officials in limiting future development and protecting sensitive resources along the shoreline—that is guidelines for the area that is within 1,000 feet of the shoreline of the bay and its tributaries. It is a very significant and very unusual step for the General Assembly and the State of Maryland to become involved in land use. That has always been resisted as being primarily a local prerogative.

What remains to be done? Our bay work is still in its infancy. Most of our programs have been underway for a little more than 1 year. We will not see results to any great extent by 1988. It is interesting to point out that most fresh water bodies take at least 5 or 10 years to respond, and because this is an estuary the Chesapeake Bay is going to take, we think, even longer.

Many remaining problems do need to be resolved. For example, nutrient relationships and their transport to the bay, target loads for nutrients; the role of nitrogen and the role of toxics.

It is our hope to address these and other questions through the phase II planning process which we expect will refine our water quality, our living resource, and our habitat objectives. In our next phase we hope to get more specific about all of these matters. That phase will probably take 2 or 3 years.

We feel very strongly that EPA must continue to be a full partner in this Chesapeake Bay cleanup effort. It is vitally important that they remain as a full partner. Their role in baywide monitoring, modeling, research, and citizen participation is absolutely essential on a continuous basis, as well as a long-term Federal commitment to the bay program.

The President, I believe, a few years ago made a commitment, a financial commitment to the bay. The commitment was 4 years. We think that commitment should be maintained and even go beyond because it is critial to our effort.

So, in conclusion, let me say that these are just a few, in the short period of time I have here, of the challenges that we face in our effort to restore the bay. We are challenged, summoned to be innovative and programmatic and progressive. It will take all of the dedication, all of the cooperation that we can muster to get the job done.

I would like to say that cooperation that has existed between Maryland, Virginia, Pennsylvania, and the District of Columbia in this effort is absolutely superb and unique.

I am so happy to see that Governor Baliles has taken a very vital interest in this effort to save the bay. He met with me early after he took office for that primary purpose to discuss the bay. So, I am very optimistic about the future, as long as this kind of cooperation, this kind of effort continues from all segments that are now involved in the effort.

Thank you, Mr. Chairman.

Senator **MATHIAS**. Thank you, Governor Hughes.

I feel, as you do, about Governor Baliles' interest in the bay and his presence here today. As I see the two of you, I can't help reflecting on how different it is and the atmosphere that has prevailed in the past. As Governor Hughes knows, the tip end of Kent Island is known as Bloody Point.

Governor **HUGHES**. Right.

Senator **MATHIAS**. It refers to a battle between Virginians and Marylanders some 300 years ago. That battle continued off and on until recently, until living memory. The fact that the two of you are here today and taking an interest in a constructive restoration of the Chesapeake Bay really is an event of historic proportions. So, we are pleased to have your statement now, Governor.

Governor **BALILES**. Thank you. Good morning, Mr. Chairman, and members of the subcommittee. I want to thank you for the opportunity to speak on a matter of common concern—the future of the Chesapeake Bay.

Mr. Chairman, you know as well as I do that one of the hardest things in a democratic system of government is to sustain a costly effort over a long period of time. To a nation too often exposed to glib solutions and the quick political fix comes a challenge of the Chesapeake Bay. Unfortunately, nothing about the bay's plight offers opportunity for an easy, short-term resolution. It took decades to bring the Chesapeake Bay to death's brink, and it will take a little while to bring her back.

Frankly, Mr. Chairman, there has been a lot said about the Chesapeake Bay in recent years, most of it supportive; nearly all of it encouraging. But it is clear that the time is past when incomiums and platitudes about our dying estuary were enough. The fight to restore the Chesapeake Bay has reached the stage of hard, deliberate action. It is hard to overstate the value of the Chesapeake Bay to Virginians. From our beginnings, the bay has provided livelihood and recreation and abundance. It has contributed greatly to the character and the quality of life in our State.

Therefore, it is both sad and ironic to concede, as we must if we are to be honest about it, that we have much to do if we are to avoid failure as stewards of this great resource.

We must and will learn from our mistakes in the past. Yet, we are equally committed to acting now in the present so that years hence future generations can draw sustenance and satisfaction from the Chesapeake Bay.

Mr. Chairman, I can state to you that Virginia will not rest until the bay has been restored. We have made a good beginning, but we are intent on seeing the job through to the end.

My full statement for the record will outline our actions regarding financial commitments, nutrient removals, Cabinet-level review, and also answers to specific questions regarding point sources and nonpoint source solutions.

It is my concern, however, that Congress not withdraw from its own pledge, its own promise, not to the people of Virginia but to the people of America to aid in the protection and restoration of the bay. The Chesapeake Bay is a national resource. Accordingly, its well-being must be a part of the national agenda.

In December 1983 the Environmental Protection Agency entered into an agreement with the basin jurisdictions: Virginia, Maryland, Pennsylvania, and the District of Columbia. This was a historic agreement to share the responsibility for management decisions and resources regarding the high priority issues of the Chesapeake Bay.

Subsequently a plan was developed, and we are proceeding with its implementation. However, no plan, no matter how well executed, will suffice without adequate funds to support it. And for that we need the help of Congress.

The implementation grants, monitoring, research, and support activities funded through EPA contribute greatly to our own efforts. What we ask is to stay with us. Virginia is in it for the long haul. I trust we will continue to have Congress as an ally in that effort.

I assure you, Mr. Chairman, that if we do act in concert, in unity and bring the Chesapeake Bay back to health, we will have the undying gratitude of generations to come.

Thank you.

Senator **Mathias**. Thank you very much, Governor Baliles.

Mayor Barry.

Mayor **Barry**. Thank you very much, Senator Mathias.

We have an invitation to testify before your subcommittee on the future of the Chesapeake Bay Restoration Program. I am glad to be here at the same table with the distinguished Governor from the State of Maryland, Governor Hughes, and the Governor from the Commonwealth of Virginia, Gerry Baliles, and a representative from the Commonwealth of Pennsylvania.

Those of us in the District of Columbia feel very strongly about the Chesapeake Bay Cleanup Program. As you know, the Potomac River runs into the Chesapeake Bay so, therefore, we can contribute to that program.

In 1983 the Federal Government and the District of Columbia and Maryland and Virginia and Pennsylvania, as you have been told, joined in a historic compact to coordinate a Chesapeake Bay Restoration and Protection effort. Each of us has committed valuable resources for the bay cleanup effort since that agreement. The regional spirit of cooperation has been very encouraging. The District of Columbia has been an active participant in this process. We have been a part of the executive committee, the operations committee, and the implementation committee.

More importantly, we have also put our own local dollars behind this effort. We have spent over $70 million of local D.C. government money for improvements to the Blue Plains Waste Water Treatment Plan to insure continued treatment of our waste water.

As a centerpiece, we have also signed an agreement with Governor Hughes and the State of Maryland, an Anacostia Watershed agreement, in order to eliminate the combined sewer overflow into our streams.

We have also spent $487,000 of our own local money which has been allocated to install erosion control measures to reduce sediment entering our waterways.

In 1985 the City Council passed the District's 1985 Water Pollution Control Act, and I signed that act, and we are in the process of developing regulations now.

We also have a storm water management program which is being developed which will continue nonpoint source pollution, that is, will prevent nonpoint source pollution from entering our streams and our rivers.

Also, Mr. Chairman, our Fisheries Management Program, working within the framework of the Chesapeake Bay Program, protects our aquatic resources, such as rockfish, and is being implemented.

This summer we intend to establish an aquatic education program to instruct our citizens on the importance of conserving these resources.

Therefore, the District of Columbia is in full partnership with the management structure of the bay restoration effort. We are very proud of what we have been able to do to the Potomac River. In fact, we are so proud of it that we are in our third year of what we call our River Fest. It is a celebration of the cleanup of the Potomac, as well as a celebration of the regional cooperation. In fact, our River Fest has gotten to be so huge that we have had to expand it to the whole month of June. The final day of it will be this Sunday, June 29, again, demonstrating our commitment not only to the exciting part of the Potomac but the difficult part of it.

We agree with Governor Hughes and Governor Baliles that this situation didn't just start overnight. It was not done in 3 years, and, therefore, it is going to take more than 3 years to clean up the bay.

I would like to support the existing Chesapeake Bay Program in its funding. I would like to continue the linkage between the Chesapeake Bay Restoration Program and the NOAA Stock Assessment Program.

We also ought ot strengthen the research capacities of the Chesapeake Bay Liaison Office and accelerate the phase II planning process.

We strongly feel that the Congress should reauthorize the Clean Water Act and get the Construction and Grant Program back on track and continue adequate funding for the section 106 State plan grant program and strengthen the Federal Nonpoint Source Program with enforcement capabilities and continue Federal research to develop standards for sediment toxicity.

I am confident, Mr. Chairman, that the Federal, State, and local governments with the participation of local residents, farmers, and private industry that we can revitalize the Chesapeake Bay and bequest it to our children.

Even though I live in the District of Columbia, I sometimes venture to the bay and do a little fishing. I am looking forward to the day when it will be even cleaner.

Finally, Mr. Chairman, as I sit with Governor Hughes and Governor Baliles and the representative from the Commonwealth of Pennsylvania, outside of wanting to clean up the Chesapeake Bay and the Potomac, it also gives me a great feeling to be around Governors and, therefore, I want to get statehood and full government for the District of Columbia so I can sit and have "Governor" by this name, as opposed to "Mayor."

Again, thank you very much, Mr. Chairman.

Senator MATHIAS. It is a great pleasure to have you with us, Mayor Barry. It is encouraging to hear your statement.

I think it is also important that you should be here because, by your presence, you recognize that broad interest and responsibility which extends not just to the banks of the Chesapeake but to the whole drainage reparian areas. I think this is an important thing. That, of course, is true of Mr. Cook whom we are happy to welcome.

Mayor Barry's prepared statement and the responses to written questions will be accepted for the record.

Senator MATHIAS. Mr. Cook.

Mr. COOK. Thank you, Mr. Chairman. Governor Thornburgh asked me to express his regrets for not being able to be here this morning. He asked me to present his testimony.

But before doing that, I would like to express my personal pleasure at being here. Ten years ago, I joined the Environmental Protection Agency and was one of the first staff hired for the initial Chesapeake Bay Program. Under your guidance I have seen that program grow over 10 years to what it is today, and that is a compliment to you; and I sincerely hope that the program continues to go forward.

I will now present to you Governor Thornburgh's testimony.

I am pleased to have this opportunity today to present my views on the current progress of the cleanup and the future direction of the Chesapeake Bay Program. Pennsylvania's signing of the Chesapeake Bay agreement in December 1983 marked the Commonwealth's commitment to the effort to clean up the Chesapeake Bay and signaled the beginning of a strong and lasting partnership with our neighbors, the State of Maryland, the Commonwealth of Virginia, and the District of Columbia, to develop a comprehensive program to restore the largest estuary in the United States to its former greatness.

Assisting in this partnership has been the U.S. Environmental Protection Agency, which early on established its commitment to the project by providing the leadership, inspiration, and resources to carry out this joint effort. The Chesapeake Bay is a national treasure and the water quality problems of the bay are of an interstate nature. For these reasons, the bay project deserves a strong Federal presence in a coordinating role as each State does its share to protect and improve the water quality of the bay. I strongly urge this Federal-State partnership to continue beyond the current legislative authorization.

As you may know, our implementation program in Pennsylvania is geared to the reduction of nutrients from agricultural operations which have been identified by the EPA Chesapeake Bay Study as a primary source of nutrients and runoff. Although other sources contribute nutrients, the opportunity to design and install a program of best management practices on agricultural land is the most viable starting point.

The Pennsylvania Departments of Environmental Resources and Agriculture have worked closely with our major farm organizations, Federal agencies, and county conservation districts to design a Chesapeake Bay Cleanup Program readily accepted by our farm community. I am pleased to say the response and enthusiasm for the program on the part of farmers in Pennsylvania has been outstanding.

Since the initiation of the Commonwealth's program late last year, nearly 300 farmers have agreed to participate. To date, more than $1 million has been provided to 65 farmers to implement nutrient management plans that will reduce nutrient losses from soil erosion and animal wastes. Fifty percent of all our program resources are and will continue to be devoted to direct assistance to farmers to install best management practicies.

This includes $2 million in this year's budget and $2 million in my proposed budget for 1986-87.

In addition to providing direct financial assistance to farmers, we have established a comprehensive educational outreach effort to encourage all citizens of Pennsylvania to be good neighbors to the bay.

Major emphasis of our educational message is, of course, directed to the farm community and, along with the technical assistance we are providing to farmers, we are demonstrating that more careful management of fertilizer and manure will save them money, keep precious soil on the land, and keep unwanted nutrients out of the Susquehanna's stream system.

We are in agreement with the phase II planning process now underway by EPA to identify the appropriate criteria needed to protect the many uses of the bay and to develop control strategies to achieve water quality standards. Federal involvement in modeling and research are needed to provide the necessary tools to the States to fine tune each State's program to effectively carry out a phase II program.

Toxic substances pose a subtle threat to the living resources of the bay, and Pennsylvania has been implementing a point source toxic control strategy for several years through the NPDES permit process. Such efforts as this toxic control strategy should be incorporated into the phase II program.

In conclusion, I am pleased to report that we are optimistic that the well-coordinated Bay Program in Pennsylvania will produce a cleaner Susquehanna River, a more productive agricultural economy, and a greater understanding of the importance of protecting one of America's great water bodies.

Thank you for the invitation to present testimony here today. I support Pennsylvania's continued participation in the State-Federal partnership to protect and restore the Chesapeake Bay.

Senator MATHIAS. Thank you, Mr. Cook.

One of the difficulties in having such an eminent panel as this is that they are always under great time pressure.

But before the members of the panel leave, I hope they can answer one or two questions.

Senator Warner, did you want to say something?

OPENING STATEMENT OF SENATOR WARNER

Senator WARNER. Thank you, Mr. Chairman. I just remember back in 1979 when you and I and the Governors of the States of Virginia and Maryland went out to Smith Island and Tangier Island and commenced this effort. We salute you, Mr. Chairman, for your initiative, and those of us who will remain here in the Senate will carry on your good work.

Senator **MATHIAS**. Thank you very much, Senator Warner.

I agree with you that that visit to the islands was probably one of the real milestones on this road, one that would not have happened without your efforts and presence.

Senator **WARNER**. I wanted to make sure we divided time equally between Maryland and Virginia, and you agreed to that.

Senator **MATHIAS**. Without objection, Senator Warner, your written remarks will be inserted into the record at this point.

[Senator Warner's prepared statement follows:]

PREPARED STATEMENT OF SENATOR WARNER

Mr. Chairman, I am pleased to participate in this hearing to discuss the future direction of the clean up efforts to restore the Chesapeake Bay to its full natural beauty, its full productive fishery, and its full marine life.

During my first days as a member of the Senate in 1979, Senator Mathias brought me aboard in his efforts to forge a national consensus to save one of America's most important and fragile natural resources—the Chesapeake Bay.

Accompanied by former Virginia Governor John Dalton, Senator Mathias and I visited Smith Island in Maryland and historic Tangier Island in Virginia to view first-hand the fragile condition of the Bay.

Nearly a decade ago, Senator Mathias recognized that this treasured ecosystem was in trouble and persuaded the Environmental Protection Agency to begin collecting data on the environmental health of the Bay. These findings culminated in the signing of the Chesapeake Bay Agreement in 1983 by the Governors of Maryland, Virginia, Pennsylvania, and the Mayor of the District of Columbia.

This agreement represented the first step in an ambitious working partnership between the Federal Government and State governments in developing a regional strategy and committing needed funds to begin a comprehensive cleanup effort.

As we hear testimony today on the progress that has been made in the cleanup efforts and constructive recommendations on toxic and nutrient reduction goals for the future, it is only appropriate that we pause to recognize the outstanding contributions made by my colleague, Senator Mathias.

This Nation is deeply indebted to Senator Mathias for his foresight, commitment, and perseverance in spearheading the efforts to save the Chesapeake Bay. Although I am saddened that Senator Mathias will retire at the end of this Congress, I am proud to have been associated with his efforts on this project. I look forward to continuing the work my distinguished colleague has begun and carrying out his vision for the complete restoration of the Bay.

I welcome the remarks of the Governors from the participating States, EPA Administrator Thomas, and other witnesses as we begin to evaluate an appropriate direction for the cleanup programs for the Chesapeake Bay.

Senator **MATHIAS**. Let me ask this question. I think the Governors and Mayor Barry and Mr. Cook have made it clear that continuity in this program is essential. As a first step, the Governors have proposed the restoration plan which establishes general goals for the cleanup of the bay. If I can look ahead to Lee Thomas' testimony this morning, I believe he is going to suggest that the executive council form a new Chesapeake Bay agreement, possibly on the model of the Great Lakes Water Quality Agreement which has been of significant value. This new bay agreement would establish specific baywide strategies, water quality standards and load limits for the bay and for the tributaries, Mayor Barry, so this goes beyond the bay proper.

I am wondering if you have had an opportunity to consider a Great Lakes-type program. How do you view this proposal and what would you think to be an appropriate timeframe?

Governor **Hughes**. Mr. Chairman, I haven't really reviewed the Great Lakes Agreement. We haven't had an opportunity—at least I haven't had—to consider it, but it seems to me that the phase II that we are moving into should be the way we should go. Its goal is to attempt to identify and be more specific on loads and nutrients and things of that nature.

I don't know whether the Great Lakes are similar to the Chesapeake Bay or not. I don't think they are, obviously. They are not an estuary as the bay is. So, I am speaking somewhat uninformed about the Great Lakes agreement.

I do feel that we should move ahead with phase II. That is our own model, it seems to me. It is our own bay model.

Recently I signed a resolution, passed by the general assembly, urging us to implement this process and move into phase II and to start getting more specific.

I think one thing that is obvious is that there are still a lot of uncertainties. We are on the cutting edge of a lot of things that we will have to get into more specifically. I would hope that there is further research done, for example, on toxics by EPA and NOAA and the National Academy of Science. I think it ought to be a cooperative effort.

But to answer your question specifically, I would think that our efforts should be directed at really pursuing our phase II and developing our own bay model with specifics as to loan limits and goals.

Governor **Baliles**. Mr. Chairman, I would like to address that if I could, just before I beg your indulgence to leave for another commitment.

I am not aware of the new Federal proposal that you have just alluded to a moment ago that we can expect from Mr. Thomas.

It seems to me that what was created just 3 years ago was an institutional mechanism that was designed in phases to address the specific problems of the Chesapeake Bay—not the Great Lakes, not the Great Salt Lake, not some other place—but the Chesapeake Bay.

If the institutional structure that was put together by the basin jurisdictions with the concurrence of the State legislatures and the Federal Government is inadequate, then I haven't heard about it. Is it unresponsive? I haven't heard about it.

What we have is a beginning with an approach that has been developed with the full understanding and public participation. It very well may be that it can stand improvement. If so, let's refine it, but let's tailor it to the needs of the Chesapeake Bay and not some other part of the country.

It seems to me that the biggest single Federal role in all of this right now is not to address or to be so much concerned about the institutional structure as to the specific roles of each basin jurisdiction can demonstrate. To me, the fact that in Virginia for the first time we have been able to consolidate programs—30-some in number—over 12 different agencies, bringing Cabinet-level review and millions of dollars never before anticipated that we could put into a program like that, is a good start. Let's don't sidetrack it with a new institutional proposal.

Senator **Mathias**. Governor, let me interrupt you there for a second.

I don't think Mr. Thomas proposes a new institutional approach. What the Great Lakes Water Quality Agreement really contemplates is specifics, exactly what you are talking about. We have the broad institutional framework now, and the real heart of this proposal would be to get down to specific agreements on nutrients, on toxics, on phosphorus—very specific kinds of goals—within the framework that has been established.

Governor Baliles. OK, one last comment. All of us, I think, are addressing the nonpoint source pollution concerns through best management practices and other techniques. The point source pollution problems from industrial discharges can be addressed through enforcement and through scheduled compliance programs.

The other part of that point source pollution problem comes from municipal treatment plants. Congress adopted tough goals and deadlines to be developed and implemented and enforced through EPA, and the States have developed treatment programs to be implemented by those localities. The standards are still there. They are tough. They impose deadlines for localities to meet, but at the very time that the Federal standards and goals and deadlines have been imposed, the Federal dollars have been withdrawn so the Federal participatory role has gone from 85 percent of the cost to 75 percent of the cost of 55 percent of the cost, and in some cases much less than that.

Those localities in your jurisdictions and mine—many of them—are facing hundreds of million of dollars in construction costs when they have 5,000 and 10,000 people. The revenue base is not there to develop that.

We have responded, in part, by creating a revolving loan fund, by finding additional ways to make up for that, but the Federal role still is important here in financing the capital cost of those treatment plants which Congress has dictated should be done.

So, we think the Federal role is still there to be played in financing the huge construction costs that have been imposed by the mandates.

Senator Mathias. I certainly would agree with you.

Mayor Barry. Mr. Chairman, let me speak to the Great Lakes agreement. Our phase II process will lead to the establishment of numerical goals for the bay and its tributaries. Alternative baywide strategies, including costs and benefits for achieving the goals, will be evaluated. I think this is the way that we ought to go.

More importantly, Mr. Chairman, we ought to really continue to focus on the fact that the reauthorization of the Chesapeake Bay implementation grants to the States expire in 1988. We need to start now, it seems to me, to get that reauthorization beyond 1988.

Also, we need to look at—even in a time of budget restraints and budget deficits—an increase in funding to the Environmental Protection Agency's Chesapeake Bay Liaison Office. That office provides vital coordination in areas of research, monitoring, and data collection, and logistical support to the executive council and the various bay committees. The office represents the centralized resource that would have to be duplicated by the States and the District of Columbia if it is abolished, and so we would like to strongly urge a phase II movement and reauthorization. As all of us have said, the Chesapeake Bay Cleanup Program did not happen overnight. It is 1986 and it is not too early to start reauthorization now so that when we come to that date in 1988, we will be assured of the continuation of that program.

As we all have said, the States and the District of Columbia have been willing to use our own resources, but, as we all know, there is a limit as to our total capacities and our total resources because they are competing and conflicting tugs at these resources. I think we ought to keep our eye on that prize in 1988 as well as phase II.

That is notwithstanding what may be happening with the Great Lakes agreement. I don't think that ought to have any major relationship to our program.

Mr. **Cook**. Mr. Chairman, if I may, I have an advantage, I believe, over the Governors and the Mayor on dealing with this in that I studied that agreement for many years when I worked on the EPA-Chesapeake Bay Program. I can assure you that many of the concepts and principles in that agreement were incorporated in the work that has been done over the last 10 years, including the concept of that agreement. The Chesapeake Bay agreement was signed by the Governors, the Mayor, and Bill Ruckelshaus in 1983.

Pennsylvania believes that we have a good coordinating mechanism in place with the executive agreement signed in 1983 and believes it should be given full opportunity to continue the good work that it has done at this stage.

Senator **Mathias**. Let me just ask one question very quickly, and if you can give brief answers because other members may have questions. We have a rollcall vote pending in the Senate.

Both nutrients and toxics are governed by rather general approaches under the existing agreement. Do you think we should have more specific goals for specific nutrients and toxics?

Governor **Hughes**. Yes, I think eventually that is the goal of phase II. For example, on toxics the EPA study did not attribute most of the problem to toxics. It identified some hot spots on toxics, and we think that a lot more research should be done on the effect of toxics and minerals. For example, on the Patuxent River we do have load limits there, and we are monitoring and removing nitrogen. Thirty percent of it will be removed, and that will be monitored to assess its effects. So, we do feel that we should have targets; that we should be more specific. However, we have to move to it and can't do it overnight.

Senator **Mathias**. I think you are familiar with the 2-D model.

Governor **Hughes**. Somewhat, yes.

Senator **Mathias**. That would give us an opportunity to develop those strategies.

Governor **Hughes**. Yes.

Mayor **Barry**. Also, Mr. Chairman, it is my understanding that by May 1987 we will have some of the results of the 2-D model so we can see what has been the impact and estimate nutrient and reduction goals for the bay as outlined in our phase II program.

Also, Mr. Chairman, I think that a great deal is being done to look at reducing toxics from municipal sewage treatment plant discharges. Industrial discharges are being tightened up in all the jurisdictions. Urban runoff control programs are being implemented in most of the States and the District of Columbia. Maryland, Virginia, and the District of Columbia are implementing programs dealing with the discharge of chlorine into sensitive estuarian areas. Also, as the Governors have mentioned, agricultural nonpoint source control programs in Maryland, Virginia, and Pennsylvania will also result in the reduction of herbicides and pesticides, as well as nutrients. Those are very important.

That was a very important question you asked. I think this is a major part of the problem as we get into the nonpoint source runoffs but also the nutrients and toxics that actually get into the Bay or the Potomac or other tributaries.

Mr. Cook. Mr. Chairman, the agreement that was signed in 1983 by the Governors and the Mayor and Bill Ruckelshaus was set up as a coordinating body to look at the individual State standards, effluent standards, discharge standards, et cetera, for both toxics and nutrients; and the idea was for the States to be responsible for taking care of their own waste, their own water systems.

We have all been moving in that direction, and we all have been coordinating those efforts to see the positive results that can eventually be had on the water quality of the Chesapeake Bay proper.

I believe that in Pennsylvania, through our phosphorus policy that we have had in effect for some 14 years now and through the new water quality regulations that we recently passed to even improve that policy, we are definitely moving in the direction to complete the phase II planning process and proceed with that before we look at setting strict standards that would regulate the tributaries and the bay. We must know what all the facts are and what we can accomplish, first.

Senator Mathias. Senator Sarbanes.

Senator Sarbanes. Thank you, Mr. Chairman.

I have just two very quick questions. First of all, how strong is the support of your respective legislative bodies for the Chesapeake Bay cleanup?

Governor Hughes. I think I can answer that very quickly. We have very strong support in the Maryland General Assembly for this whole effort, and I think the proof is in the fact that we were able to get the critical areas criteria enacted. As you can realize, that is not easy to do.

I am glad to see on the bay commission—which is made up of Virginia and Maryland legislators—that Pennsylvania legislators have joined in that effort, so I think there is very good support.

Mayor Barry. There is good strong support in the city council for what we are doing.

Mr. Cook. I would definitely echo Governor Hughes' sentiments that with our general assembly passing the bill to make us a member of the Chesapeake Bay Commission and the simple fact that one of our Senate members of the commission is also the chairman of our Senate Appropriations Committee, that there is good support for the program.

Senator Sarbanes. Yes; we welcome Pennsylvania's joining the commission on the part of its legislature. I think that was a very important forward step.

My other question is this. What letdown in Federal participation have you seen? What could be done at the Federal level that you perceive not being done currently that would be of assistance?

Governor HUGHES. As far as EPA's involvement and so forth, I don't think we have experienced any letdown. There is one issue that has already been mentioned by Governor Baliles and that is on the water quality program which was cut back to 55 percent at the Federal level. The State of Maryland picked up that difference. As for efforts to further withdraw, we think that would have a very serious impact.

We have a need for some $60 million a year that has been planned over the next 5 years in this program. That would be a big letdown if that were to occur.

Mr. COOK. Senator, an area that I might offer is the Federal facilities that are in the basin and the handling of their hazardous wastes and their toxic substances and spills that have occurred on those sites. The rapid cleanup and the regulation of those areas would definitely be beneficial in the toxics area.

Senator MATHIAS. One last question for Governor Hughes and Mayor Barry. The possibility exists that Blue Plains will have to be enlarged to accommodate growth in Montgomery County. There is a possibility of an expansion of about 20 percent which would increase the nitrogen output into the Chesapeake Bay.

As we have noted, we don't have the results of the two-dimensional nutrient model, so we don't know exactly what the impact of this increased nitrogen will be. However, if the model results indicate that nitrogen controls on the plant are necessary, has there been any thinking, up to this point, as to how that would be dealt with as part of the planned expansion?

It is kind of a hypothetical question to throw at you because until we have the 2-D results, we can't be sure; but I am just wondering if there is any thinking along that line.

Mayor BARRY. Mr. Chairman, there has been some thinking along that line. We consider ourselves a forward-looking administration. The Blue Plains plant will be expanded to 370 million gallons per day.

But let me just add that it will result in less than a 5-percent increase in nitrogen in the Potomac estuary. As you know, the Potomac is much like the bay in that it acts as a sink for nutrients, and most of the nitrogen would be trapped in the sediment or lost in the atmosphere.

Also, Mr. Chairman, we are in the design stage of the expansion program, and after the development of a detailed three-dimensional time variable computer model for the bay has been completed, we can then determine the impact of different actions and control strategies. And the plant design facilities is such that if there is an adverse impact, we can add additional ingredients and additional facilities at Blue Plains to bring that back down; so we have already thought about it and planned for architectural design and the other kinds of designs as part of the Blue Plains expansion. It has a built-in component which will allow for evaluation of the results as well as a move to correct anything that has an adverse impact.

So, we have thought about and we are planning for it. And, the local jurisdictions are spending about $200,000 next year investigating nitrogen and phosphorus in the estuary so that we can begin to see if this expansion has an adverse impact.

Governor **Hughes**. Very briefly, Mr. Chairman, I guess it will be asked of the organization that issues the permit, that is, the EPA. They are probably better equipped to answer this question.

But we in Maryland have been seriously concerned about the nutrient controls and the levels of treatment on both sides of the river in the Greater Washington area. We have urged EPA to insure that stringent limits for both nitrogen and phosphorus will be applied and that, as a minimum, they should employ nitrofication.

So, we are concerned. If the monitoring concludes that nitrogen controls are needed, for example, then they are going to have to be installed.

Mayor **Barry**. And we support that effort.

Senator **Mathias**. Well, that is encouraging to hear from both of you.

We are very grateful to all of you for being with us this morning.

Since all members of the committee are jogging over to vote, I will join them. The committee will take a short recess. Senator Warner went first, and he will presumably be back first and he can resume the hearing as soon as he returns.

The committee stands in recess.

[Recess taken.]

Senator **Warner** [presiding]. The hearing will now continue with panel II consisting of the Honorable Lee M. Thomas, Administrator, Environmental Protection Agency.

I will thank you, ladies and gentlemen, for taking your seats. The chairman has instructed us to continue right along in his brief absence while he has to go and vote.

Mr. Administrator, we welcome you. You are no stranger to this issue. As a matter of fact, you have worked with us very closely and enthusiastically, in my judgment, in trying to effect the goals as laid down by this group some many years ago.

We are happy to see you this morning.

TESTIMONY OF LEE M. THOMAS, ADMINISTRATOR, U.S. ENVIRONMENTAL PROTECTION AGENCY,[1] ACCOMPANIED BY JAMES SEIF, EPA REGION III ADMINISTRATOR

Mr. **Thomas**. Thank you, Mr. Chairman. I appreciate the opportunity to be with you today. I have with me, Jim Seif, who is our regional Administrator from Philadelphia and also chairman of the Chesapeake Bay Council.

Senator **Warner**. We welcome Mr. Seif.

Mr. **Thomas**. Senator Mathias is not here, but I would not want to start off a discussion of the Chesapeake Bay without commenting on the kind of leadership that he has displayed over the years.

Senator **Warner**. Why don't you finish up with it, then?

Mr. **Thomas**. I will when he comes back; that is a good point.

As you know, a number of years ago the issue of the Chesapeake Bay and the identification of its problems surfaced. The environmental health of the bay has been a long term issue for this Agency, as well as for the Bay States and the Congress.

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[1] See p. 80 for the prepared statement, with attachments, of Mr. Thomas and p. 97 for responses to written questions.

A number of years ago we identified the basic problems that we are currently attacking. Those problems are the decline in the living resources of the bay, the significant increase in nutrient levels, and the high concentrations of toxics in some specific locations.

In 1983 there was a broad outline of solutions for the bay's problems. The need to institute land-use controls at and near the shoreline, the need for nonpoint source controls for agricultural and urban runoff at a number of locations, the need for point source controls, particularly municipal treatment controls, and also the need for broad wetlands protection in the overall watershed for the bay were identified.

As you have heard from the three Governors and the Mayor of the District of Columbia, a tremendous amount of action has been taken by those jurisdictions. In my opinion over the last couple years those jurisdictions have been models of action.

The kind of legislative actions, appropriations at the State level, work by Federal, State, and local agencies together has been very aggressive. But, as we all know, the problem took a long time to create, and it is not going to be solved in a very short time. It is going to take a long-term commitment.

We are moving forward—not only the actions that the States have outlined but actions that the Federal Government is undertaking. As you will hear from one of subsequent panels, a number of Federal agencies including EPA are very active in promoting and implementing solutions to the bay's problems.

As we complete our phase II planning efforts we are at a point where we can look back at the agreement that was signed in 1983 and its possible revision and modification.

In my written testimony, I use the Great Lakes Water Quality Agreement as an example of the kind of agreement which contains more specific definitions of the kind of solutions that are needed. This example builds on the kind of agreement that was signed in 1983. I agree with what your State representatives were saying in the first panel. We want to build on that 1983 agreement as we move to more specific goals.

I feel that over the next year we ought to be able to complete a revised agreement that would include specific water quality and living resource goals for the major tributaries of the bay. I think it should include load limits for the tributaries. I think that it should specify technologies and management measures to meet those load limits, and I think it should be specific about the schedules, as well as the assigned responsibilities between State and Federal agencies to carry out and implement those goals.

With that kind of specification we can move forward, building on the action that has been taken during he last 2 years but with very clear benchmarks which we will monitor what our success is in a quantitative fashion across the multiple jurisdictions that have to take action.

In conclusion, we all need to be committed to this for the long term. The State agencies, which you heard this morning, clearly are. Local agencies are. And Federal agencies are. There is no question in my mind that EPA has got to continue for the long term with its leadership role, a commitment of resources to this most important effort.

As a matter of fact, we have used our experience in the Chesapeake Bay as a model as we begin to look at estuary problems in other parts of the country. Efforts in Puget Sound, San Francisco Bay, and Narragansett Bay, and a number of others are modeled after what we are doing in the Chesapeake Bay. The kind of citizen participation, State and Federal participation, long-term monitoring and long-term commitment to finding solutions to tough environmental problems like those in the Chesapeake Bay are models for other estuaries. That is what this program is all about.

I appreciate the opportunity to be with you today to continue our discussions about this important initiative.

Senator **WARNER**. Thank you, Mr. Administrator.

Without objection, we will place in the record your written statement.

I will call, first, on my colleague, Senator Trible.

Senator **TRIBLE**. Mr. Thomas, I want to commend your leadership and the good job that you are doing at EPA. I want to also acknowledge the commitment of the Federal Government and EPA to the enhancement of the quality of the Chesapeake Bay and surely we would want to make that a continuing effort and enterprise.

Let me ask you about TBT. The use of this highly toxic substance in antifouling paints is widespread. It is a matter of mounting concern to me and to many Virginians, and I know that EPA is undertaking a full and comprehensive study to determine exactly what the risk might be to our marine environment.

Can you bring us up to date on that effort and perhaps share with us some preliminary findings or at least give us some sense of direction and timing?

Mr. **THOMAS**. We are going forward on several fronts to take a look at the TBT issue. We are using the authorities of our pesticide program—FIFRA—and have initiated a data call under our special review provisions. Those provisions are activated when we have reason for concern about a particular pesticide. We have requested that a series of detailed toxicological studies on TBT be made to assess its impact on aquatic organisms.

We also have integrated our concern over this pesticide with our bay program by identifying specific locations in the bay where we will be monitoring to determine what kind of water quality problems we have from TBT.

We have identified four different locations for the monitoring efforts—where there is heavy boating use, where there is medium or moderate use, and where there is very little boating use. With this information we can begin to look at the kind of impacts, from a quantitative point of view, taking place from antifouling paint. We are working those things in parallell with our pesticide program efforts.

And our actions can range from no action to restrictions to cancellation, depending upon the kind of results that come back from the tests. The results should be available within the next year to 18 months and you will see the agency taking action based on them.

Senator TRIBLE. Tell me again, if you will, the timing of the study and this observation process and your sense of when we may start getting some real solid data.

Mr. THOMAS. The actual monitoring work will begin to bear results within the next 12 to 18 months. Our special review process under FIFRA generally requires 18 months to 2 years.

Senator TRIBLE. I would hope that that monitoring effort would include the lower Chesapeake Bay because that is an area, of course, that it is incredibly important to the shellfish life in the Chesapeake Bay, but it is also an area visited by Navy ships and by commercial vessels that are painted with these paints that include TBT.

I asked the Navy to desist in their program to paint their ships. The Secretary of the Navy declined to do so, and it was necessary for me to advance an amendment, then adopted by the full Senate and the Congress, telling the Navy that they could not proceed with that program until we had the benefit of your input.

So, there are a lot of us who await the results of your study and monitoring process, and we will want to work with you in that process.

Mr. THOMAS. Senator, we are working with the Navy. The Navy is providing resources, specifically lab resources, as we go forward with this analysis effort.

Senator TRIBLE. One final point, if I may, Mr. Chairman.

I would just call to your attention the good offices and expertise of the Virginia Institute of Marine Science. I know that you have worked with them for years, but they have focused on this problem and, of course, share our interest in seeing the Chesapeake Bay revitalized and brought to full life once again.

Thank you, Mr. Chairman.

Senator MATHIAS. Thank you.

Senator Warner.

Senator WARNER. Thank you, Mr. Chairman. I have just a question here. Drinking water is a subject that is of great interest to us. As we see further development in our communities that border on the bay—and this is particularly a problem in tidewater Virginia—the communities resort to the traditional method, namely, the storage of water on the tributaries that are feeding the bay, what is you assessment of the impact on the bay itself of this ever-growing need to collect more water in the tributaries.

Mr. THOMAS. Senator, it is a difficult issue and one that I am concered about. As I indicated, one of the solutions to the bay's problems identified in 1983 agreement was wetlands protection in the bay watershed.

As communities look for improved water supplies, they look at impoundments. Impoundments potentially can destroy significant and critical wetlands areas. I have discussed this matter with Bob Dawson from the Corps of Engineers who will be with you later. Particularly in Virginia, I would like to see a number of the communities taking a broader look at the impact of wetland destruction by impoundments and what the alternatives may be.

We have done a good bit of work on reverse osmosis process. We are moving forward to try to demonstrate that process to Virginia communities. As you know, there has also been a lot of thought in

Virginia regarding the possibilty of transmission of water by pipeline from other parts of the State.

For the long term we need to look at a number of communities as it related to their plans for improved water supplies and the consequences to the bay from resulting wetlands destruction.

Senator WARNER. I thank you.

Thank you, Mr. Chairman.

Senator MATHIAS. I am happy that we have been joined by the Senator from Pennsylvania, Mr. Specter.

OPENING STATEMENT OF SENATOR SPECTER

Senator SPECTER. Thank you very much, Mr. Chairman. I am delighted to be here on this very important subject.

At the outset I would like to congratulate you, Administrator Thomas, on your outstanding efforts in EPA, and I thank you for a lot of the help which you have provided for many matters which touch Pennsylvania.

I know we have all been working hard for reauthorization of Superfund and to see that that matter moves forward.

I want to thank you for the excellent assistance of Mr. Seif who has been very helpful to us more recently on the radon problem. Mr. Seif and I were in Boyertown and Allentown. We have a long list of matters which await your urgent attention—the Butler Mine Tunnel and Old Forge and so many matters that we can't begin to enumerate them here without perhaps even offending as gracious a chairman as Senator Mathias to unduly burden this record with some of the Pennsylvania issues.

But I do want to thank you for your help.

One question which I have, Mr. Thomas, relates to the specific role which is seen for the Susquehanna River which is a factor in the environmental cleanup of the Chesapeake Bay and what do you foresee as the long-term strategy of the bay cleanup as it will impact on the Susquehanna River which flows, of course, through Pennsylvania.

Mr. THOMAS. Clearly the river has a major impact insofar as the overall water quality of the bay is concerned.

The actions that Pennsylvania has committed to and, actually, has begun to implement, the nonpoint source programs that they have begun to put in place along the Susquehanna are exactly the kind of actions that I think are going to be required for the long term.

As we begin to identify in phase II of the bay efforts, specific loading limits as they relate to water quality goals for the tributaries of the bay, like the Susquehanna, are going to require a commitment like the best management practice program that Pennsylavania has initiated.

The direction that Pennsylvania has taken over the last couple of yeas as a partner to the overall bay effort is commendable and exactly the kind of direction that I think we are going to have to continue for the long term.

Senator SPECTER. Well, I would be confident that Governor Thornburgh and Lieutenant Governor Scranton would be fully cooperative on this matter. You have the extra assurance of having

Mr. Seif at your right hand because he has worked in State government for a long while, but I am glad to hear your reassurances that you would expect that Pennsylvania's government—the Thornburgh/Scranton administration—would be helpful and fully cooperative in precisely what you seek to achieve here.

I see you are nodding yes.

Mr. THOMAS. They certainly have been. As I indicated before, I think the kind of commitments that have been made at least in the last couple of years since I have been Administrator and the actions that have been taken by the three States and the District of Columbia are exactly the kind of action that we have got to take. It is commendable. It is the kind of leadership that is required and will be required for the long term to make the water quality improvements that are needed in the bay.

Senator SPECTER. Is it you expectation that the administration will fully reauthorize the Chesapeake Bay Cleanup Program?

Mr. THOMAS. A commitment is needed from State jurisdiction, as well as from the Federal Government. The authorization process for the bay program has largely been through the appropriations process on an annual basis. We have made a commitment to continue the level of commitment that was begun a couple of years ago through 1988. In my opinion there is no question that that kind of commitment is going to have to continue.

The Federal agency participation that is evidenced by the memorandum of understanding between our agency and others, the commitment you will hear about when the Department of Defense and other Federal representatives testify are the kind of Federal commitment needed.

It is the kind of 10-year commitment that will be needed if you are going to see the environmental results that we want in the Chesapeake Bay.

Senator SPECTER. Thank you very much, Mr. Thomas. Thank you, Mr. Chairman.

Senator MATHIAS, Thank you, Senator Specter.

Mr. Thomas, I want to personally welcome you to the committee today. But more than that, I want to express my appreciation for all that you have done. In fact, I suppose my appreciation ought to be expressed in a kind of dual fashion. I am institutionally grateful to EPA because, as you know, EPA has been involved in the Chesapeake Bay effort from its very inception. In fact, your predecessor, Russell Train, deserves a great deal of credit for the initiation of the program. But EPA, as an institution, has been magnificient in its acceptance of this challenge, and people throughout the EPA organization have dedicated themselves in a very personal way to the Chesapeake Bay effort. I see Tudor Davies here and others.

It is hard to pick out individuals who have just made a great personal investment, and I am grateful for that.

But, beyond that, you yourself have involved yourself in a very personal kind of way in the Chesapeake Bay effort, and you have gone, I think, beyond the requirements of your position of leadership in EPA to be personally knowledgeable about it. This is an enormously encouraging thing to me. I think it will be to people not only those who have an interest in the bay as a particular body of water but the people all around the country who are interested in similar problems and similar solutions.

So, I do thank you.

You will recall that in 1983 your Chesapeake Bay Program study linked increased nutrient levels of nitrogen and phosphorus to the deterioration of water quality in the bay. To improve the water quality the study indicated that nitrogen and phosphorus inputs would somehow have to be reduced.

I suppose my question at this date is whether EPA is prepared to revise the advanced treatment policy to allow the upgrading of sewage treatment plants to remove nitrogen.

Mr. THOMAS. That is a major consideration as far as the agency is concerned. The technical advisory committee for the bay identified, in conjunction with the overall work in the Agency, the possibility of improved methods for nitrogen removal from POTW's, methods that would not only allow for increased reduction of nitrogen but at far less cost.

This is prompting us to look further at the overall requirements for nitrogen removal as far as POTW's are concerned, and specifically as it concerns the bay.

As you know, I think the nutrient issue is both a point source and a nonpoint source issue for the bay. We have got to go forward on both sides of that equation to reduce those nutrients.

Senator MATHIAS. Could there be baywide nitrogen controls on a pilot program basis? As you know, the State of Maryland is doing that in a very limited way in the Patuxent River.

Mr. THOMAS. I am sorry. I didn't hear the first part of your question, Senator.

Senator MATHIAS. Could there be some pilot program, such as the one that Maryland is operating on the Patuxent River?

Mr. THOMAS. Let me ask Jim Seif to respond, Senator.

Mr. SEIF. The people of Maryland—Jim Guttman and many other citizens—as well as State government personnel have made that proposal. I personally would like to see the Agency endorse that idea. The Patuxent has a good headstart in terms of the assessment of problems that are raised by imposing those kinds of standards.

Whether or not it is feasible baywide or nationwide is something that the regulatory process will have to work through. For the bay I think it is a good—I might say experiment but it should be more than an experiment—and I think it will produce results.

Senator MATHIAS. There was a story in the Washington Post which raised a question about the National Pollution Discharge Elimination System, the NPDES, the permit system for activities in the bay.

I am wondering if you are familiar with that question and whether there ought to be some changes in the NPDES permit system and in the enforcement policies that affect the bay.

Mr. THOMAS. I could provide for the record a copy of an article that was prepared by our Agency in partial response to the Washington Post story. Unfortunately, the Post has indicated that they are not going to be able to use the article even though they initially indicated that they would.

Senator **Mathias**. We will use it here. We will hereby admit it for the record so that it will get into print.

Without objection, that will be made a part of the record.[1]

Mr. **Thomas**. The EPA article puts it in a little broader context. Improvements in the NPDES Program nationally are being considered by the Congress right now in the CWA reauthorizaiton bills. I think you will see Congress actually make some of those changes.

Insofar as the States of Virginia and Maryland specifically are concerned, we actually have made a good bit more progress, I believe, than might have been evidenced by the Post article.

For instance, pretreatment is a major issue as it relates to toxics. The Agency has virtually completed its effluent guideline program. Of 24 effluent guidelines that we were preparing, we have completed 23 of them. We have the last one proposed and in the process of going final. Both States have made good progress in the revisions of the permits. A good bit of progress has also been made ensuring that each POTW's has a pretreatment program and that it is being enforced.

While there is always room for improvement in enforcement, I think over the last couple of years we have seen such improvments being made. There is always room for improvement in compliance by Federal facilities. Again, I think we have seen such improvements being made by the Federal facilities, as I think you will hear from their spokesmen in a panel later on today.

The main thing the bay NPDES Program needs is the continuance now of the commitment made during the last several years by the Federal Government and the States. And, we need to be aggressive in ensuring compliance.

I think that there is a better story to be told than might have come out in the Post article, although I don't want to dispute the fact that I think there is always room for improvement. We are working on that. A part of our effort has always got to be a very aggressive oversight program, not only the Federal Government but by State governments. And, I think that citizen groups can play a very effective role too.

Mr. **Seif**. Senator, if I may add a point about the article, there is an unfortunate implication in the article, that the problems with point sources are continuing to be significant and serious and, therefore, we need not concentrate or perhaps shouldn't be concentrating as heavily as we are on nonpoint sources. It is clear that nonpoint sources are a very serious threat to the bay, and it would be unfortunate if the implication of the article caused anybody to say, "We should not have initiatives like the critical areas initiative and other such projects underway."

Senator **Mathias**. Of course, one of the most elusive aspects of the whole bay program is identifying what is the real culprit. In an earlier stage of the bay cleanup we were sure that we could put our fingers on a couple of industrial sources and that if we cleaned them up, then things would immediately get better. As you know and as you talk down this road, you solve one problem after another and you find there are still more problems out there ahead of you.

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[1] See p. 451.

It is my understanding that after the Great Lakes Program was well underway, it was found that nutrients which had been the real object of the cleanup were not in fact the main problem that was originally thought. Toxic compounds were found to be much more important and requiring much more immediate attention.

We have some toxic problems in the Chesapeake Bay.

Do you have any judgment as to whether or not we will find that toxic problems are more important than we now think they are? Can you look into the future a little bit in that area?

Mr. THOMAS. What we find in the bay is what we have found in so many of our other environmental issues. The solutions are as complex as the definition of the problems, and they will evolve over time. I think that the overall identification of nutrients and toxics as a dual set of problems that have to be attacked simultaneously is the direction we need to go.

From the scientific information that we have at this point nutrient control is a major issue. In terms of its impact on living resources of the bay. We have also identified spots around the bay where toxics are also a significant concern. Dealing with both problems, ensuring that we have a good aggressive monitoring program over time and not allowing that data base to fade are important element of this commitment. We want to see what progress we are making, and also further define the problem that we are trying to attack.

That is part of what is happening in the Great Lakes. We have made progress in some respects. We have also improved our knowledge of the Great Lakes as we have gone along, just as we intend to do in the bay.

So, over time we cannot only identify progress but we can more specifically indentify the problems we need to concentrate on. It is not an either—or situation; it is a matter of gathering information so that we can refine our attack on a broad range of problems.

Senator MATHIAS. Does this seems to require—as I tried to ask the Governors and perhaps I used too short a shorthand in referring to the Great Lakes agreement—a need for specific water quality standards and loading goals for the bay with respect to particular toxic pollutants?

Mr. THOMAS. I think it does, Senator, and I think we are getting to that point. I think those Governors would all agree—and their staffs would agree—that that is the point we are coming to in phase II.

My reference to the Great Lakes agreement, as you clarified, was as an example of that kind of specificity, and it was not as suggested something that would replace our Chesapeake Bay agreement of 1983.

Senator MATHIAS. Obviously we wouldn't transport it.

Mr. THOMAS. The level of specificity that we came to in the Great Lakes agreement is what we need to build on the 1983 Chesapeake Bay agreement. I think we are coming to the point in the next year or so that we can begin to get more specific about water quality goals, loading limits for each of the tributaries, defining specific responsibilities among jurisdictions and identifying benchmarks that we want to use to evaluate our success.

I think the Governors would all agree with that approach. That was the approach that we have used in the Great Lakes. Even with that approach over time we must constantly seek better information and refine responsibilities.

Senator **Mathias**. Is the esturine character of the Chesapeake Bay a factor here? In other words, should there be toxic water quality criteria for estuaries?

Mr. **Thomas**. From our point of view, each estuary has characteristics that are unique. We have to look very closely at each one, and I think we have to look at the water quality standards that are appropriate for that estuary. Our estuarine program around the country has shown us the uniqueness of each estuary. Puget Sound has its own characteristics for example and, therefore, we have to look specifically at what kinds of water quality standards that are appropriate for that estuary, just as we do for the Chesapeake Bay.

We are coming to a point where we can constantly refine and improve our understanding of the bay and its characteristics. That is why I feel we are getting to a point where we can be more specific with our long-term plan.

Senator **Mathias**. Well, once again, Mr. Thomas, I hope you will convey to everyone at EPA the appreciation that we feel for your continuing efforts, and take with you our own personal thanks to you for your own leadership and efforts.

Mr. **Thomas**. Senator, I would like to conclude by conveying to you from the people at EPA how much we really appreciate the kind of leadership, the kind of commitment that you have shown. It is exactly the kind of leadership that I think is required to deal with these tough environmental issues.

Senator **Mathias**. Thank you very much. Just tell them I will be watching.

Mr. **Thomas**. Yes, sir; we hope so.

Senator **Mathias**. Our next panel—panel No. III—will consist of William C. Baker, president, Chesapeake Bay Foundation; Charles J. Fox, director, Chesapeake Bay Project of the Environmental Policy Institute; and Dr. Louis E. Sage, vice president, Division of Environmental Research, the Academy of Natural Science, Philadelphia.

Will, we will ask you to start. We are going to have to limit oral presentations, as you know, but all statements will be included in the record in full.

TESTIMONY OF WILLIAM C. BAKER, PRESIDENT, CHESAPEAKE BAY FOUNDATION; [1] J. CHARLES FOX, DIRECTOR, CHESAPEAKE BAY PROJECT, ENVIRONMENTAL POLICY INSTITUTE; [2] AND LOUIS E. SAGE, VICE-PRESIDENT, DIVISION OF ENVIRONMENTAL RESEARCH, THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA [3]

Mr. **Baker**. Mr. Chairman, at the outset, I would like to thank you for your years of outstanding leadership in promoting the bay's restoration. We appreciate the opportunity to participate and reflect on the Chesapeake Bay Program, a little over 3 years since we last presented testimony to this committee at which time we recommended the creation of the EPA Liaison Office.

The Chesapeake Bay Foundation is a conservation organization supported by nearly 40,000 members representing every State in the Union. I should note that CBF staff members occupy offices in Richmond, Annapolis, and within the next few weeks Harrisburg, PA.

The EPA, or the Chesapeake Bay Program, as it has come to be called, represents excellent coordination between State and Federal Government. EPA, the lead Federal agency, has done a creditable job while Governors Thornburgh, Hughes, Robb, and now Baliles, and certainly Mayor Barry, deserve equal credit.

Governor Hughes deserves special praise for an aggressive effort for the bay that has not avoided the controversial issues, such as land-use planning, the phosphate ban, and the rockfish moratorium.

Funding for all Federal and State programs must be continued, and serious consideration should be given to an increasing of the appropriations.

In my written testimony several recommendations have been made. Let me highlight just a few of the specific recommendations.

Senator **Mathias**. Without objection, your written statement will be inserted into the record.

Mr. **Baker**. No. 1, an interim nutrient reduction strategy for enriched tributaries that includes nitrogen removal must begin now. It is ironic that EPA still refuses to fund nitrogen removal in spite of its own study's findings.

No. 2, comprehensive land-use planning, such as that legislation passed by the Maryland General Assembly should be supported throughout the watershed.

No. 3, phosphate bans should be promoted in Virginia and Pennsylvania.

No. 4, long-term funding for agriculture cost-sharing initiatives and sewage treatment plant construction grant programs must be aggressively pursued.

No. 5, enforcement of existing environmental laws and implementation of pretreatment programs should receive a higher priority.

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[1] See p. 106 for Mr. Baker's prepared statement, with attachments, and p. 121 for responses to written questions.

[2] See p. 144 for Mr. Fox's prepared statement.

[3] See p. 173 for Mr. Sage's responses to written questions.

No. 6, water quality standards for toxics should be established during phase II.

Finally, No. 7, membership on the executive council and implementation committee should be broadened to include the private sector. A management structure, composed solely of State and Federal officials, is not optimal.

In conclusion, I should say that Chesapeake Bay Foundation applauds the combined Federal-State initiatives to help save the bay. Thus far, however, the programs have only scratched the surface. They must not only be continued, but they must be strengthened. It has taken decades to pollute the bay, and it will likely take that long to clean it up.

Thank you.

Senator MATHIAS. Mr. Fox.

Mr. FOX. Thank you, Mr. Chairman.

My name is Charles Fox. I am the director of the Chesapeake Bay project for the Environmental Policy Institute in Washington, DC.

Our work on the Chesapeake over the past 2½ years has involved research and lobbying at both Federal and State levels on a host of issues affecting the Chesapeake. We truly appreciate the opportunity to appear here today with such distinguished Chesapeake leaders to offer our views on the future direction of the Chesapeake Bay Program.

At the onset, let me echo the words of those before me and say that we very much appreciate all that you have accomplished on the Chesapeake over the past decade. If this cleanup effort is to be successful, that is precisely the type of commitment that will be needed.

The Chesapeake Bay restoration effort is frequently billed as a model for other cleanup efforts around the country. While certainly true in many respects, we share Mr. Thomas' view and feel that the Chesapeake community may have much to learn from the 15-year experience on the Great Lakes.

To understand the significance of the Great Lakes agreement, let me briefly describe the existing baywide plan. In September 1985 the Chesapeake Executive Council released the much heralded Chesapeake Bay restoration and protection plan. We criticized that document at that time as being of little use because it failed to establish the specific baywide goals and strategies necessary to guide the bay program into the next century.

The Great Lakes agreement is completely different. It lays out specific goals and standards for a host of pollutants affecting the lakes. In Lakes Erie and Ontario, for example, the agreement specifies that phosphorous inputs be reduced by almost 50 percent below 1976 levels, and that figure continues indefinitely, regardless of population growth or additional sewage treatment capacities.

The need for a baywide agreement between the States is underscored by two pending proposals which pose significant threats to the Chesapeake. One is the 20-percent expansion of the District's Blue Plains Waste Water Treatment Plant which will substantially increase nutrients loads to the Potomac. The other is the Soil Conservation Service's Chester River project which will likely impact more than 3,000 acres of wetlands and, at the same time, increase nutrient and sediment loads to the bay.

Clearly an agreement will not solve all the bay's problems. In fact, it will just provide a specific outline for the steps that need to be taken. The point is that currently we have no such outline for the Chesapeake.

In closing, let me say that with or without an agreement, much more can and should be done immediately for the Chesapeake. Will Baker mentioned some of these things in his testimony, and the recent Washington Post article highlighted some others. Yes, we need to move forward on nitrogen control, greatly expand and improve our enforcement programs, enact a phosphate ban in Virginia, and begin to tackle the politically difficult issues of land use and growth management. Hopefully the future will yield leaders like the chairman and the Governors so that we can tackle these issues head on. Only then will the effort be truly successful.

Thank you.

Senator MATHIAS. Thank you very much, Mr. Fox.

Without objection, your written statement will be made a part of the record.

Dr. Sage.

Mr. SAGE. Thank you, Mr. Chairman.

It is my pleasure to appear before this subcommittee to testify on a subject of great interest to all of us in this room and to millions of Americans—restoring the vitality of Chesapeake Bay. I served as director of our Chesapeake Bay laboratory for 10 years and have continued to serve on numerous scientific and citizen advisory groups that focus on the bay.

Although I would like to recognize the many successes of the Chesapeake Bay Program, in the interest of time I will confine my remarks to those areas in need of adjustments to meet our goals.

At the outset, I want to emphasize the need for Congress to reauthorize the Chesapeake Bay Program. The program is just now reaching a degree of maturity with an effective organizational network that extends from EPA through the Federal agencies and State agencies. The program is now poised to begin fulfilling its original promise—to restore the living resources of the bay. The demise of that organizational structure would be catastrophic to the momentum that has been gained, both in terms of public support and the results achieved.

There are three critical needs within the program that must be addressed if we are to be successful in restoring the bay. One, to define the objectives to achieve those goals, and we have heard some of these this morning. Two, meeting our informational needs, and there are many. Three, some organizational changes.

At the present, the program is bogged down in accommodating the individual interests of the participants, and sustained progress will not be realized until a specific set of objectives necessary to achieve our goal is negotiated with Federal agencies and the States. The specific commitment of all parties must be secured in terms of dedicated resources and staff sufficient to accomplish the task.

Finally, EPA must have the authority to aggressively pursue these program objectives and goals. A growing obstacle to the success of the program is the lack of adequate scientific information on which to base implementation strategies that are both cost efficient and effective. This shortage of information has resulted in the practice of implementing piecemeal actions by the States to maintain public support of the overall effort. And I refer to the phosphorus ban.

This practice will seriously hamper our ability to implement and assess strategies in the future. The program must be committed to the development of the essential information. Yes, more funding is needed to support targeted research, and I emphasize "targeted research," to provide information needed to proceed with greater certainty.

A prime example of the need for specific information is the problem of choosing an appropriate nutrient control strategy. In 1980, at a retreat of 40 stakeholders, the overwhelming consensus—with only one dissenting—was to implement a strategy of both nitrogen and phosphorus removal in a selected tributary—the Patuxent—to directly assess the benefits of this strategy which, from all indirect evidence, was the strategy of choice.

Today, 6 years later, this course of action, although most appropriate, has not yet been implemented, and the resulting measurements of the benefits derived are not available to us at a time when we are confronted with implementing a costly basinwide strategy in the face of deteriorating water quality.

There are other serious information needs requiring focused research in the area of fate and transport of toxics, the role of wetlands, and the role of ground water. All of us are committed to restoring the vitality of the Chesapeake. The reauthorization of the Chesapeake Bay Program is necessary, but the issues that I have raised this morning must be addressed if that goal is to be realized.

Thank you, Mr. Chairman.

Senator MATHIAS. Thank you very much, Dr. Sage.

Mr. Fox has to some extent discussed the Great Lakes agreement question. Mr. Baker, what is your feeling about using the Great Lakes agreement as a model for the bay cleanup effort and establishing specific strategies and water quality standards and load limits for the bay?

Mr. BAKER. Absolutely support it. As I understrand it, you are talking about increased specificity, and that is what we have been talking about for a number of years and still think that is one of the greatest needs in this program.

Senator MATHIAS. And that isn't in conflict with any of the existing institutional arrangements?

Mr. BAKER. No; I don't see it as changing the institutional framework at all; it is only building upon the institutional framework.

Senator MATHIAS. It is tightening the focus, really, and refining the goals a little more particularly.

Would you agree, Dr. Sage?

Mr. SAGE. Absolutely. I think my first point was that we need the objectives to be more clearly focused, and that is exactly along the lines that I think will accomplish our intended goal.

Senator MATHIAS. You also make the point that we are acting on a piecemeal basis.

Mr. SAGE. Right.

Senator MATHIAS. Particularly in dealing with the nutrient problem and that, rather than developing a baywide nutrient control strategy, we are going at it piece by piece.

The results of the 2-D nutrient model will be available, as has been said this morning, next May. Do you think we ought to have some kind of interim nitrogen reduction goals in the bay when the results of 2-D are made available?

Mr. SAGE. Well, I do think there should be a cap on future additions to nitrogen, that is, for nutrients in general. I think the main concern is that we still don't know, even with the 2-D model, what the resulting benefits will be in the living resources. We still avoid making that connection between improved water quality and the response that we will see in the oysters and the crabs and the fish. One of the suggestions that has come from the Scientific and Technilcal Advisory Committee [STAC] is that we look at one tributary to implement a nutrient strategy so we can assess those benefits that are accrued.

Senator MATHIAS. Do you have any suggestions?

Mr. SAGE. Yes; I think particularly we should move ahead with a nutrient strategy on the Patuxent and one river down in Virginia so that we can assess the benefits derived. It also provides us with a means to assess the reliability of these models on which we are going to be basing a great deal of our management strategies—we are going to be developing them from those models, and we need to have some sort of a postaudit of those models.

Senator MATHIAS. Mr. Fox, do you have any comments?

Mr. FOX. Mr. Chairman, thanks.

We heard the Governors earlier today talk about the so-called phase II process that is being used to develop the level of specificity that the bay program needs. I would like to stress that this phase II process may be a very effective process for the nutrient issue because of the 2-D model that you recognized. Very soon we will have a model which can go at the nutrient issue in a first-cut sense, so to speak.

But when you talk about issues like toxics and living resources, the modeling process and the level of specificity isn't quite as clear, and I think an agreement approach with certain deadlines might be the better approach to have and come up with some conclusions and some frameworks based on an agreement, absent the phase II process.

Senator MATHIAS. Mr. Baker.

Mr. BAKER. We have put a lot of stock in mathematical models and their results in the past. Not to diminish the importance of them, but I don't think we ought to make the same mistake twice. I think we have got the information now, especially with the nutrient side, to start working on nitrogen removal in some highly enriched tributaries. We want to get the results of the model, but let's not hold up on a strategy until we have them. We might end up waiting too long.

Senator MATHIAS. Let me ask you a question that I asked Mr. Thomas and get your view on it.

As I said after the Great Lakes cleanup was underway, it was discovered that nutrients weren't as big a problem as they were thought to be and that toxic compounds were a bigger problem than they had been thought to be.

What do you think the probabilities are that we will have the same kind of awakening in the Chesapeake Bay?

Mr. BAKER. I am always reminded of H.L. Menken in this instance who said, "There is a simple answer to every complex problem—neat, plausible, and wrong." We always want to find that simple answer to the Chesapeake Bay decline, but you are so right in that we have to keep looking at each aspect of the pollution. Toxics are certainly a very strong contributing factor to the decline of certain species, we believe. Nutrients are a strong contributing factor to the DO problem in the bay. Overharvesting of fisheries resources is a problem with reduced stocks, so you can't say there is a silver bullet that will help solve our problems. You have to go forward with each of the strategies.

I think in specific answer to your question the issue of toxics, because they do bioaccumulate in the food chain and they do stay in the sediment, is going to become, again, a prime focus of our concern in the future. I just hope at that time we don't lose sight of the nutrient problem.

Senator MATHIAS. Any other comment on that?

Mr. SAGE. I would endorse the goal or the strategy of having a balanced approach. Certainly as soon as we start improving the nutrients, and the oxygen levels in the bottom waters of the Chesapeake improve, then we are going to see hot spots where there are going to be problems with toxics, so having a balanced approach from the onset is critical. We shouldn't put all of our emphasis on nutrients; we should have a balanced program.

Senator MATHIAS. Let me give you one question before I have to resume jogging on the floor of the Senate.

It is anticipated that by the year 2000 there will be a bay area population of something in the order of magnitude of 15 million people. Of course, that means that there will be a lot of digging, a lot of building, a lot of developing, a lot of highway construction. Land use is clearly one of the critical practices that has to be considered in dealing with bay problems.

Do you have any observation on the practical ways to deal with that? Governor Hughes, in his written testimony, says that we haven't come up with good answers to the questions of controlling land use and urban sprawl.

Your organizations are particularly situated, I think, to help with the public education problem in this area.

What comment would you make?

Mr. BAKER. The only thing I would add to our written testimony where we deal with this is in some detail is that we do know how to improve our ability to develop lands through the use of best management practices in development. Just the use of porous pavement on parking lots could do a great deal. We need to expand and, really, require throughout the watershed that best management practices are used in developing our land.

Mr. FOX. Mr. Chairman, I would just like to say that in Virginia it is a very unique problem. Some parts, even right on the bay, do not have zoning, much less comprehensive plans that get into the types of things that Will is talking about.

In Virginia there is a clear need for increased technical assistance, and I suspect the same goes for Maryland. Unfortunately, this is probably mostly a State issue that is best left to and dealt with by the States.

Senator Mathias. Gentlemen, thank you very much. I am sorry that I have to leave, but my speed is just about adequate to make it before the end of this rollcall, I hope.

I appreciate your being with us and appreciate your written testimony as well as your oral presentations.

We will ask panel IV to come to the witness table. I will go over and vote and return as quickly as possible. You can all judge my speed by how long it takes me to get to the Capitol and back.

We will take a short recess until I return.

[Recess taken.]

Senator Mathias. The committee will come to order.

Panel IV, which I am happy to welcome, includes the Honorable George S. Dunlop, Assistant Secretary for Natural Resources and Environment, U.S. Department of Agriculture; the Honorable Robert K. Dawson, Assistant Secretary for Civil Works, U.S. Department of the Army; the Honorable Robert Stone, Deputy Assistant Secretary for Installations, U.S. Department of Defense; the Honorable J. Curtis Mack, Deputy Administrator, National Oceanic and Atmospheric Administration; and the Honorable Frank H. Dunkle, Director, Fish and Wildlife Service, U.S. Department of the Interior.

Gentlemen, we are happy to welcome you all. Individually and collectively you represent the working or the cutting edge of the Federal Government's effort in the Chesapeake Bay. So, your testimony is particularly important.

I offer you the same opportunity that I have offered other witnesses, that your full statements will be included in the record and I hope that you can summarize your statements.

Mr. Dunlop.

TESTIMONY OF GEORGE S. DUNLOP, ASSISTANT SECRETARY FOR NATURAL RESOURCES AND ENVIRONMENT, DEPARTMENT OF AGRICULTURE; [1] ROBERT A. STONE, DEPUTY ASSISTANT SECRETARY FOR INSTALLATIONS, DEPARTMENT OF DEFENSE; [2] J. CURTIS MACK II, DEPUTY ADMINISTRATOR, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION; [3] ROBERT K. DAWSON, ASSISTANT SECRETARY FOR CIVIL WORKS, DEPARTMENT OF THE ARMY; [4] AND FRANK H. DUNKLE, DIRECTOR, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR [5]

Mr. Dunlop. Thank you, Mr. Chairman. I am just delighted to be here. I appreciate the opportunity to come.

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[1] See p. 176 for Mr. Dunlop's prepared statement and p. 185 for response to written questions.

[2] See p. 191 for Mr. Stone's prepared statement.

[3] See p. 199 for Mr. Mack's prepared statement, with a attachments, and p. 222 for responses to written questions.

[4] See p. 249 for Mr. Dawson's prepared statement and p. 253 for responses to written questions.

[5] See p. 270 for responses to written questions.

As you know, the Department of Agriculture has been very, very involved in matters relating to the Chesapeake Bay Program for many years, but especially since President Reagan identified it as a major initiative of his administration in 1983.

We feel we have a really exciting story to tell about the USDA's role in involving itself with State and local jurisdictions and with local people in the Chesapeake Bay Program. Our activity, of course, is predicated upon the principle that the appropriate Federal role is to provide resources for planning and coordination, with actual effort being undertaken on the State, local, and private levels.

This approach has been particularly successful with the Chesapeake Bay Program, and I wish to point out eight different things that are being undertaken that would be of interest to this committee as it seeks to better understand the types of things that need to be done in the future and that are being done now.

We have four different USDA agencies directly involved in these activities. First of all is the Soil Conservation Service. As you know, largely through your leadership they are providing 31 personnel to three States at an annual cost of $1.140 million, and they have ongoing programs in the six States in the basin with total expenditures that exceed or approach about $15 million in water quality improvement.

Senator **MATHIAS**. I am not sure that was leadership; that was just hard manual work.

Mr. **DUNLOP**. It sure was, Senator. USDA is proud and our people are very, very proud to be associated with that.

I might say at this juncture that here today we have brought along two people—Walt Rethal and Jerry Calhoun—who are employed by the Soil Conservation Service and who help provide this coordination. They are just outstanding technical people, and they know these programs very well.

For the record, I have a detailed list of the SCS activities, and, indeed, a large map[1] that I will not show right at this point for want of time, but maybe we can discuss that later if you wish. It illustrates those activities for which this $15 million is being employed.

Senator **MATHIAS**. They will be made a part of the record at this point.

[The information referred to follows:]

SCS PROGRAMS THAT HELP THE BAY

SURVEYS AND PLANT MATERIALS

Soil survey are being conducted in eight counties in Virginia and in Baltimore City, Maryland for making soil intrepretations.

Soil surveys reports in Dorchester and Montgomery County, Maryland and Adams and York County, Pennsylvania are being updated.

SCS Plant Material Centers are evaluating grasses and providing stock for demonstration of shoreline erosion control, dune stabilization, and other critical area plantings.

SCS is developing a Geographic Information System (GIS) in cooperation with the Geological Survey (USGS) for the Chesapeake Bay drainage basin to demonstrate the increased uses and usefulness of GIS technology.

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[1] The map referred to may be found in the subcommittee files.

CONSERVATION PLANNING AND APPLICATION

Developing conservation and/or water quality plans for implementation of the Agricultural Conservation Program (ACP), Clean Lakes Program, Resource Conservation and Development Program (RC&D), Rural Clean Water Program (RCWP), Rural Abandoned Mine Program (RAMP), Watershed Protection and Flood Prevention Program (PL-566), cost-share programs for the States of Maryland, Pennsylvania, and Virginia, and for individual farmers implementing BMP's without cost-share programs.

Obligated $9,259,600 and 159 staff years in FY-1984 and $14,730,000 and 189 staff years in FY-1985 for on-going programs benefitting water quality within the six-state Chesapeake Bay drainage basin area.

TECHNICAL ASSISTANCE

Provides technical assistance through on-going programs, in cooperation with local soil and water conservation districts, to plan, design and implement best management practices in support of the state and federal cost-share programs for control of nonpoint sources of pollution from agricultural and urban lands and control excess nutrients from animal wastes.

Increased funds and staff in Maryland (13 positions—$470,000), Pennsylvania (13 positions—$490,000), and Virginia (5 positions— $180,000) to accelerate agricultural NPS pollution control activities.

Assigned a Resource Conservationist to assist EPA with the review, update, and use of the Chesapeake Bay Computer Model.

Assigned a full-time position to serve as Liaison between the six State Conservationists having drainage into the Bay, and the other six federal agencies, three state governments, and the District of Columbia cooperating in the cleanup of the Chesapeake Bay.

Updating technical Standards and Specifications for agricultural Best Management Practices.

Provides training to federal, state, and local conservation district personnel for understanding of relationships between agricultural land management practices and water quality.

Provides technical supervision to state and local conservation district employees for implementation of best management systems.

INFORMATION AND EDUCATION

Developed three exhibits titled "FARMING SMARTER FOR A CLEANER BAY".

Cooperating with other federal and state agencies and universities in developing fact sheets and informational material for the control of nonpoint source pollution.

Provided funds for developing the video entitled "Riders on the Storm".

Provided funds for initial establishment of the Chesapeake Regional Information Service (CRIS).

Provides outreach to encourage landowners/operators in critical areas to participate in NPS implementation.

All Soil Conservation Service programs are administered in cooperation with the respective State Soil and Water Conservation agency and local Conservation Districts.

"CONSERVATION ON THE LAND = IMPROVED WATER QUALITY"

CHESAPEAKE BAY BRIEFING:

DATE: 6/24/86

SCS SPECIAL FUNDING-

STATE	FY. 86	POSITIONS
MD.	470,000	13
PA.	490,000	13
VA.	180,000	5
	1,140,000	31

CONSERVATION RESERVE FUNDING-

STATE	ELIGIBLE LAND (ACRES)	ACCEPTED BIDS (ACRES)	RENTAL PAYMENTS: ($/YEAR)	PERCENT BID ACRES OF TOTAL	PERCENT OF STATE IN CHESAPEAKE BAY
DE. TOTAL	13,900	0	0	0.00%	34.9
MD. TOTAL	241,800	610	31,764	0.25%	96.6
NY. TOTAL	536,300	10,400	565,800	1.94%	12.6
PA. TOTAL	1,142,900	10,740	592,697	0.94%	49.2
VA. TOTAL	606,300	8,580	378,336	1.42%	53.9
WV. TOTAL	203,700	130	5,821	0.06%	14.5
STATES TO	2,744,900	30,460	1,574,418		

DAIRY BUYOUT PROGRAM-

STATE	BIDS ACCEPTED (NUMBER)	PERCENT OF STATE (NUMBER)	CONTRACT DOLLARS (1000)	TOTAL ANIMALS (NUMBER)
DE.	9	4.83	790	1,011
MD.	115	7.40	19,325	15,001
NY.	542	4.09	75,443	55,183
PA.	418	2.75	42,469	33,322
VA.	199	9.46	28,695	28,154
WV.	53	12.10	6,557	5,895
TOTAL	1,336		173,279	138,566

Mr. DUNLOP. Senator, in addition to the Soil Conservation Service, the Cooperative State Research Service is involved in many activities. They have spent this year 350,000 Federal dollars which leverages a total of $1.4 million of State and local activity. I might say, Senator, that the kind of work they do with this research effort is just absolutely essential to get an understanding of the specific load levels and things like that that we need to focus on to be able to solve these problems, rather than just talk about them.

I brought along for the record an example of one of the most significant studies that has been done in this cooperative way by Cornell University, University of Delaware, University of Maryland, and Pennsylvania State University.

In addition to those two agencies, we have a third, and, that is the Cooperative Extension Service. There are about $500,000 in Federal funds leveraging a total of about $1.6 million State and Federal funds total. The type of work they do, of course, is again cooperative done on the State and local level, and they have put together, for example, in Maryland a brochure that has been sponsored by the Commissioner of Agriculture of this State, putting his imprimatur upon bringing to the farmers' attention the practices that they should employ that would protect this important resource. All these brochures and documents, I think, are an important and pertinent part of the record.

Pennsylvania has a similar folder and, indeed, I believe other States do as well. But this is just an example of the type of thing that is going on with the coordination activity of the Department of Agriculture.

Then, finally, and maybe in many ways just as interesting as these other things, is the Forest Service. The U.S. Forest Service is providing a tremendous amount of coordinating activity with the State forestry programs in all of the six States. One of the goals that they have is to establish a 1,000-foot perimeter of trees and other forest cover on the bay. Of course, as you know, these trees would have a tremendous capacity to absorb excess nutrients and then provide enhanced wildlife and other things as well, as long as we keep them as young, growing forests.

Maryland is leading in this. Yesterday I had a visit with the State forester from Maryland who is very enthusiastic about what they are undertaking in your State.

Mr. Chairman, I think that maybe in addition to mentioning those four things that are specifically focused as water quality improvement activities of the Department of Agriculture—and which I might say are going on all over the Nation—there is another category of new Federal activity that is going to impact directly in a very favorable way on the bay program.

First of all, I would mention the 1985 farm bill whole herd dairy buyout scheme. This year we have already paid $175 million to about 5,000 farmers in the six States whose rivers and streams feed the bay. Some 140,000 animals have been eliminaed in this area, by this program, and, of course, that is a tremendous amount of nutrient and manure and other things like that that work its way into the stream and which have simply been eliminated.

The Conservation Reserve Program. In 1986, 30,460 acres have been removed in the six States from agricultural production at a cost that exceeds $1,574,000.

Just to give you an idea of the potential and the further development and activity that is going to take place with the conservation reserve in this basin, this 30,000-plus acres is just 1.1 percent of the total eligible land in these six States.

In addition to that, of course, there are the provisions in the farm bill relating to what we call sodbuster and swampbuster provisions which deny program benefits from the Department of Agriculture to those farmers who bring fragile lands into cultivation.

Finally, I might mention one that may be the most significant of all of these developments as we move down the pike a couple of years—the Conservation Compliance Program. As you know, the Department of Agriculture puts out massive amounts of subsidies this year, plus many more billions of Farmers Home Loans and other types of things, such as crop insurance.

Conservation cross compliance will deny these program benefits to farmers who refuse to employe sound conservation practices on lands that are determined to be highly erosive and have other problems of the sort that would impact adversely on the bay, begining in 1995.

Finally, I might mention one other thing that doesn't have very much to do with the Government, except with our encouragement, and that is the general move toward greater conservation tillage in our agriculture production system. The technological innovations that are taking place in that regard are incredible. I received across my desk just yesterday a statement or a press release about trends in double cropping which is one form of conservation tillage. There has been a 100-percent increase in the past 10 years, and we now have double cropping on 12.4 million acres which is 4 percent of the total agriculture production system.

As these innovations move in to the production system, it is going to mean that agriculture generally is going to be posing less of a problem in the years ahead to the bay than it has in the past, particularly if we keep the focus of the sort that you have now.

I might say, in closing, that USDA simply makes one major recommendation. It has been addressed here today by the other witnesses, and that is before we can really get down to business to where all of this planning and all of this coordination and all of these other things that have been going on can mean anything, we are going to have to have clearly defined and specifically quantified goals. Otherwise we just don't know what to shoot for and what to do and what kind of practices to require.

In my prepared testimony there is a sentence that I might read which says: "USDA recommends that these goals should initially be established as a river load reduction goal for each pollutant of concern from nonpoint sources of pollution." Once these pollutant loads have been established, then we can set up the basin plans and the other types of activities that would be undertaken by these agencies, as I have described.

Senator MATHIAS. Thank you very much, Mr. Dunlop.

Without objection, your written statement will be made a part of the record.

Mr. Stone.

Mr. STONE. Thank you very much, Mr. Chairman.

Senator MATHIAS. Before you start, let me say that we stand in some danger of another rollcall, so if we could hope to complete this panel's direct testimony by 12:30 or a little before, then we would have a chance for some questions, so if you can keep yourself to 3 to 5 minutes, I would appreciate it.

Mr. STONE. I will shoot for the low end of that, Mr. Chairman.

The goal of the Defense Department, the environmental goal is leadership. Decide what ought to be done and then do it. We want to be good neighbors and an asset to the bay as we carry out essential defense missions.

We have made a lot of progress in recent years, but we realize that we, like our neighbors on the bay, have more to do.

The resolution of cooperation that Secretary Weinberger and Mr. Ruckelshaus signed has helped. We have spent a lot of money, built a lot of facilities for pollution abatement and prevention, and we have learned a lot. And there are a number of examples in my written statement.

Our resource management programs have reduced soil runoff, preserved wetlands, and reduced shoreline erosion at many defense installations. The Army has actually increased wetlands at Aberdeen Proving Ground, or rather army beavers did it for us. We have spent millions of dollars on installation restoration. That means systematically identifying former waste disposal sites, evaluating them, and cleaning up. Much work remains to be done on these sites.

We have also started a systematic study effort to help us understand better the Department of Defense impact on the bay. My estimate is the defense installations account for about 5 percent of all discharges to the bay.

But at seven installations, our preliminary data suggests that we need to do better to eliminate existing and potential discharges of pollutants. These are the installations where we are focusing our greatest efforts.

At all our installations, if we know how to eliminate or reduce our pollution discharges, we will do it; if we don't know what to do, we will work closely with EPA and with the States to find the right answers.

The three-star and four-star commanders who run our big industrial operations think this is so important that they have set up a special program to ensure that Defense takes a leadership role in minimizing discharges of pollutants.

Like our neighbors, defense has achieved many but not all of our goals for environmental protection. Just 2 weeks ago, I visited Aberdeen and came upon a flock of blue herons flying over their breeding grounds, and that sight symbolized to me both the progress we have made as well as the need to do more.

The more we learn about the bay, the more we realize that all pollutant discharges must be reduced. While defense is a small part of the total problem of the bay, we recognize that we must be leaders in protecting the bay.

Our goal is excellence in the quality of life at all of our military installations. Meeting that goal requires our continued leadership in environmental protection.

Thank you.

Senator MATHIAS. Thank you.

Without objection, your written statement will be made a part of the record.

Mr. MACK. Thank you, Mr. Chairman. I am pleased to be here this morning to appear before you and the subcommittee to describe NOAA's views on the Chesapeake Bay Program.

Since you have requested that we keep our testimony short, I will try to do this in the next 2 or 3 minutes. I simply would like to highlight our major activities in the bay and note their applicability to the phase II programs.

We have submitted a more detailed testimony to you for the record which specifically answers the eight questions that you previously have given to us.

Senator MATHIAS. The detailed testimony, without objection, will become a part of the record.

Mr. MACK. In 1985, NOAA spent approximately $5 million in the Chesapeake Bay through ongoing and specific appropriations. In addition, NOAA provides nautical charts, weather forecasts, and fisheries and habitat conservation efforts. Our involvement in the Chesapeake includes efforts to characterize the conditions of the bay, provide research results, to answer priority questions, and support the management of the bay's critical coastal and fisheries resources.

All of these activities support the goal of the Chesapeake Bay Program to restore the living resources. Our efforts address the four major factors affecting the living resources, those of pollution, habitat, fishing, and natural variability.

NOAA received appropriations to conduct Chesapeake Bay studies, and the focus of these studies has been threefold: to undertake fisheries resource assessments, to examine problems of oxygen depletion, and to improve fisheries statistics. We are also identifying and acquiring existing data for the Chesapeake Bay Program Data Center.

In terms of fisheries resources assessments and statistics, the NOAA estuarine program office and the NOAA National Marine Fisheries Service established a stock assessment committee for the Chesapeake Bay. The committee membership, which includes representatives from the States of Maryland and Virginia, the District of Columbia, academic institutions, and other Federal agencies, is developing a cooperative program for a baywide assessment of fishery resources which consists of a number of integrated efforts, including studies to improve the knowledge of important bay stocks and improved techniques for conducting stock assessments, working groups to improve fishery data bases and statistics, studies to evaluate the relative effects of natural mortality fishing and pollution, and an annual report on the status of stocks. Significant progress has been made in addressing the first two of these goals.

In terms of low dissolved oxygen studies, low oxygen levels in the water can harm or kill many marine and estuarine organisms. Information, therefore, is needed on the causes and extent of low oxygen levels in the waters and the effects these conditions have on bay resources.

During fiscal year 1985, NOAA funded studies to determine the factors that lead to low oxygen levels and the physical forces that distribute these poorly oxygenated waters in the bay. Preliminary results of these studies have documented the variability of the low dissolved oxygen conditions. These results indicate that the Chesapeake will remain vulnerable to widespread enoxia, particularly in years having strong spring runoff.

In terms of identification and acquisition of data, our National Environmental Satellite and Data Information Service—NESDIS—is making significant strides in identifying and acquiring existing data for the bay's program computer. As a result of this effort, most files at the computer center are now described in NOAA's National Environmental Data Referral Service and are easily accessible by the public. This service is essentially a computer catalog of environmental information which describes and quantifies data sets by types, source, and location. In addition, we have begun to identify high priority data sets, not included in the Chesapeake Bay Program computer.

With regard to our ongoing programs, we are conducting studies to characterize the current status of the Chesapeake Bay and its living resources. We monitor the status of contaminants in the fishery organisms and the sediments at several stations in the bay through our National Status and Trends Program.

Through our laboratories and associated institutions, we are undertaking important research on the bay. Among the many research projects, we are studying the larval transport of economically important species, such as the blue crab, using a numerical model of the Chesapeake Bay and adjacent shelf waters.

To manage the bay's coastal resources, NOAA provides grants and technical expertise to the States. Through our coastal zone management and interstate grant programs, we sponsor numerous activities to improve the quality of the bay. Also, our National Marine Fishery Service staff has evaluated literally thousands of Federal permits and continually has mitigation strategies to minimize the impacts to living resources in their natural habitats.

The efforts I have just described will be integrated with the Chesapeake Bay Program. Planning progress is outlined in our written testimony. However, to meet the goals of the implementation program, we recognize that there will be a need to continue efforts far beyond 1988.

I thank you for your interest, Senator.

Senator MATHIAS. Thank you very much, Mr. Mack.

Without objection, your written statement will be made a part of the record.

Mr. DAWSON. Mr. Chairman, thank you for the opportunity to be here to report on the Army's role in restoring the environmental health of a true national treasure, the Chesapeake Bay.

The Army Corps of Engineers has been involved in the bay for more than 190 years. In 1967 Congress directed us to undertake the first comprehensive study of how the bay works. We expended over

$30 million which included construction of a hydraulic model of the bay.

I could talk about a number of things, such as the $200,000 we have contributed toward an interagency effort to map and identify the distribution of bay grasses. I could note the June 6 signing with Governor Hughes, Governor Baliles, and Deputy Mayor Downes of a 10-year cost-sharing agreement to control hydrilla in the Potomac River. I might note that we are integrating the Chesapeake Bay Program's environmental goals into its regulatory operations. I am pleased to note that both Maryland and Virginia have recently signed landmark cost-sharing agreements to permit the improvements to Baltimore and Norfolk harbors to proceed when user fee legislation for navigation is enacted, along with the numerous environmental safeguards, Mr. Chairman, that have been incorporated into those projects. It is important to note that increased local cost-sharing policies have substantially reduced the amount of dredging required while still meeting the navigation needs of these ports.

The corps is making reconnaissance phase studies addressing erosion control and drought management which may eventually aid local jurisdictions in controlling practices which degrade the bay.

Finally, Mr. Chairman, we have got good people working on this in the Army Corps of Engineers, people with the right training and judgment to do these challenging jobs.

We welcome our continuing role in the restoration of this great national asset.

Thank you very much.

Senator **MATHIAS**. Thank you, Mr. Dawson.

Without objection, your written statement will become a part of the record.

Mr. Dunkle.

Mr. **DUNKLE**. Mr. Chairman, I am pleased to discuss with you today the importance of the Chesapeake Bay Restoration Program and in particular the role of the Fish and Wildlife Service in that program.

As the Service's new Director, it is my first opportunity to speak to you and the committee, and I welcome this discussion and the future discussions of one of our Nation's most valuable resources, for fish and wildlife, known as the Chesapeake Bay.

In your invitation letter, Mr. Chairman, you asked that we address eight questions. I have provided responses in my formal testimony. I also have testimony that was prepared by the U.S. Geological Survey that I will submit with your approval.[1]

Senator **MATHIAS**. Those both will become a part of the record.

Mr. **DUNKLE**. Mr. Chairman, the Chesapeake Bay is a very important estuary, and the multiagency effort to improve the Cleanup Program is of critical importance to restore the water quality and to replenish the bay's resources, especially migratory birds and anadromous fish, as well as its wetlands.

The Service has a vital interest in this restoration program since it has five national wildlife refuges and one fish hatchery on or adjacent to the bay. The restoration program is ambitious and will demand the dedication of the participants over the years to come.

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[1] See p. 382

The Service is prepared to continue its role of protecting the bay's resources. Interior Secretary Hodel has launched his "Take Pride in Ameirca" campaign, a major program designed to foster citizen appreciation for public lands and natural resources.

The Service is using this campaign to urge mid-Atlantic citizens to take pride in the Chesapeake Bay, a theme that the service has adopted for its role in the bay program.

The Service officially became involved in the restoration program after signing a meorandum of understanding with the Environmental Protection Agency in 1984. The memorandum identifies the Service's responsiblities and related capabilities for fish and wildlife resources.

Prior to this agreement, the Service maintained a close relationship with the Environmental Protection Agency during the research phase of the bay program and has long dealt with bay problems concerning habitat protection, anadromous fish, and migratory waterfowl.

The Service has developed an implementation plan in conjunction with the memorandum of understanding to assist in reversing the adverse biological impacts of water pollution. Activities focus on the impact of land use on water quality and fish and wildlife resources and on assessing the efforts at specific sites of industrial effluent on animals and plants.

The Service is actively angaged with Maryland and Virginia in restoring striped bass by hatchery production of fingerlings.

The Service is also working to monitor trends in critical resources, primarily submerged aquatic vegetation and waterfowl, to establish a system whereby future management priorities can be developed.

In closing, I would like to note the Service's commitment to the goals of the Chesapeake Bay Program. With the concentrated efforts of each of the involved Federal agencies and the efforts of the State and local governments and private citizens, it is our hope that the water quality of the bay and the bay's resources will be restored.

Mr. Chairman, this concludes my remarks. May I commend you on your efforts to see that the bay becomes a productive, usable area again in our lifetime? I stand ready to answer any questions.

Senator **MATHIAS**. Thank you very much, Mr. Dunkle.

The range of your statement, I think, confirm my earlier comments that taken together the Federal agencies that you recommend really have the destiny of the bay very largely in their hands. I am encouraged by the kind of dedication and commitment that you have exhibited in your testimony here today.

One of the problems is runoff, agricultural runoff. Agricultural practices are very difficult to alter. As a part-time farmer myself, I can testify to that firsthand. But even after we have made some progress in getting vegetative filter strips and conservation tillage underway, there is some evidence now that that may not be enough to meet water quality standards, that some other things will have to be done.

Will the Department of Agriculture increase its efforts in reviewing standards and specifications to reflect greater water quality standards and best managemnt practices that will increase water quality standards?

Mr. Dunlop. Yes, Senator, without question they will. Indeed, they have already begun to do that. As we move into the greater understanding of these things, the Soil Conservation Service and the other agencies have already begun these reviews. They will get right to the bottom of every detail that they need to do to have the best practices possible.

Senator Mathias. As I said earlier, this is an elusive kind of program because you think you have the answers, and when you acquire the answers in one area, the goal seems to move further away. Tillage practices alone and strips, vegetative strips may not be enough, so I am encouraged to hear that you are willing to go further.

One of the areas of concern has been compliance with NPDES permit requirements and toxic compound cleanup. This, of course, becomes a problem with the Department of Defense. There are a number of facilities that have remarkable conservation programs. The Navy Supply Center is another, just for examples.

But I am wondering how the Department of Defense would respond to the apparent need to improve compliance in this area.

Mr. Stone. We agree that the Department of Defense needs to improve, Mr. Chairman. Our goal is certainly compliance with all the NPDES requirements.

Senator Mathias. So, you feel that within the Department of Defense there will not be resistance to total compliance with any reasonable standards?

Mr. Stone. That is correct. Perhaps in the Pentagon we can do even a better job than we have in making clear what the rules are, but there is no question as to what the rules are, and I don't see any prospect for any——

Senator Mathias. That is an important point, and it really bears on the whole subject of today's hearing. If you know what the rules are specifically, you can do better. I think that is a helpful comment.

Mr. Stone. We will keep trying to make it more clear as to what the rules are, Mr. Chairman

Senator Mathias. Mr. Dunkle, your agency has the lead responsibility for wetland and habitat protection in the bay area. The Army Corps has primary jurisdiction over wetland protection through the 404 permit process. How do you assess the implementation of the 404 program with respect to the bay area, Baltimore and Norfolk, in particular? Is joint permit processing involving all the agencies that are concerned a realistic approach to use in the bay or is the present system adequate in your judgment?

Mr. Dunkle. Mr. Chairman, we have recently developed a new memorandum of understanding with the corps. It was just completed between Assistant Secretary Dawson and Assistant Secretary Horn and lays out some new and rather specific approaches to the section 404 permitting system that is administered by the Corps with advisory input from the Fish and Wildlife Service.

Implementation of the agreement started off well and seems to be working, and I think that the agreement will be the basis for a much more coordinated approach to the development of permits and to the protection that development procedures should provide for the bay area.

Senator MATHIAS. Mr. Dawson, the Corps of Engineers was asked by the Chesapeake Bay Executive Council to build a three-dimensional water quality model, and all of the groups that are interested in the bay are looking to this 3-D model for guidance and direction as to where to go in the future. Can you tell us when the corps will actually be able to begin development of the model?

Mr. DAWSON. Senator Mathias, as you well know, in addition to the entities you mentioned, both you and Senator Sarbanes have written me and the Secretary of the Army on that matter. We are giving it active consideration right now. I am not able today to tell you exactly when that would proceed, but I can tell you that that is a top priority matter for us to make a determination on and to answer your letter, as well as other interest that has been expressed on that subject.

Senator MATHIAS. Will you keep us up to date on that development?

Mr. DAWSON. Yes, sir.

Senator MATHIAS. Before I yield to Senator Sarbanes, let me ask Mr. Mack an easy question. There has been a lot of discussion about the taking of striped bass. Do you see a need for a coastwide moratorium on taking striped bass?

Mr. MACK. Senator, we have deferred to the States to decide that question as to whether there should be a moratorium or whether there should not be, and it has been our position that as long as the individual States meet the goals that are assigned to them under the Atlantic States Marine Fisheries Commission that we will support them.

We support the State of Maryland's moratorium, and should other States decide to implement such a moratorium, we would support them also.

Senator MATHIAS. Even with easy question, you gave me an easy answer.

I am not trying to press you.

Mr. MACK. I understand that, Senator, but we do believe that there is a position for the States and a position for us. We would like to encourage the States to do various things, but in terms of some of these fisheries resources we do believe that the proper place would be for the States to make that decision.

Senator MATHIAS. But you have set up a stock assessment committee.

Mr. MACK. That is correct, sir.

Senator MATHIAS. That is to collect data on the striped bass. That is an important development, I think.

What about integrating that committee into the executive council structure?

Mr. MACK. We know that over a period of time that there may be various changes in the structure that should take place. We feel the stock assessment committee would be the natural link between the water quality requirements and studies and those of the living marine resources. The stock assessment committee is designed to develop technology and data to assess the effects of climate fishery efforts and pollution, and with the data that is developed through that study we can help establish pollution load, habitat requirements, and things of that sort and look at the effects that the load requirements may have on tne living marine resources.

Senator **Mathias**. Let me yield to Senator Sarbanes.

Senator **Sarbanes**. Thank you, Mr. Chairman. I am sorry that I had to be away, but that is part of the job, I guess.

First of all, Secretary Dawson, I want to underscore Senator Mathias' question about the three-dimensional water quality model. We have written to you about this, and how important it is that we think that the corps participate in that and undertake its development.

The corps, of course, has a recognized expertise. I was encouraged to hear you say that you had it under very active consideration because I have discovered in the past with you that very often when you have something under very active consideration, we end up with a positive decision with respect to that matter, and I would hope that that pattern would be realized again on this occasion.

The corps, in many ways, is critical to all of this. It is interesting. The corps for years had a particular statutory mandate which did not encompass looking at environmental questions and was often sharply criticized by people concerned about the environment for the positions that it took. Of course, it wasn't handled that mandate, so in a sense the corps was not to weigh those matters in the scale.

The statutory mandate of the corps was then broadened by the Congress to encompass environmental judgments, as well, and as a consequence the corps in many, many instances has become the very effective protector and champion of the environment. You have great skill and expertise in your agency. I have tremendous respect for the abilities of the corps, and we are very anxious to draw them in as much as we can into this bay effort, so I am hopeful that your active consideration is going to result in a positive decision. As Senator Mathias said, I am sure we are going to stay in very close touch with you about that.

Mr. **Dawson**. Yes, sir.

Senator **Sarbanes**. Secretary Stone, I wanted to just address a concern about the—we have had some problems up at Aberdeen, as you are aware, I am sure. We think they are on their way to resolution. Part of that, I think, is an improved working relationship between the Department of Defense and the particular installation and the State people charged with environmental regulation. One of the things that I am concerned about is the extent to which the Department of Defense is sensitive to the need to work closely with the State officials. I understand the department has joined in this Federal consortium and, of course, works with the EPA; but I want to take it a step further to press on you the necessity to really join in a working relationship or partnership. Many of the responsibilities for enforcing some of the legislation we passed are delegated by the EPA to the State authorities.

I think one of the problems that developed at Aberdeen—and I am not trying to point the finger one way or the other—was a breakdown of the kind of close communication that I think ought to have existed between the installation and the State people who are charged by delegation from the EPA with certain environmental responsibilities.

How sensitive are you and how can we make up—do we need to make you more sensitive? How can you assure us on that particular issue?

Mr. **Stone**. You don't need to make us more sensitive, Senator Sarbanes. I agree with everything you have said. Our installation commanders all across America have to deal with State and sometimes with local regulators. They understand that. It is part of our policy. We have a policy of openness.

I think, like the situation with water discharges, we have to keep clarifying and reemphasizing the policy, but it is really a job for us to do, and we understand what our responsibilities are.

Senator **Sarbanes**. Do the other agencies want to make any comment on this question of close cooperation with the State people?

Mr. **Dunlop**. I might say, Senator Sarbanes, representing the Department of Agriculture, that in my testimony we went to some length to describe the unique relationship that the Department of Agriculture has with States. All of our effort is virtually cooperative with the States in that regard.

Mr. **Mack**. Senator, I might mention also that on behalf of NOAA that much of our efforts in many of the areas is only done through the cooperation of the States and the various C-grant programs to do much of the research that is necessary for us to accumulate the data that we need to do our part.

Senator **Sarbanes**. Let me say, finally, that I think Senator Mathias has done a very skillful job of assembling this panel because he has really put on it a number of people who have, in a sense, direct responsibilities for making this whole effort move and work. We very much look to the five of you and to others to make the Federal participation, this bringing together not only the commitment of EPA but the bringing together of other agencies.

I am hopeful that at the end of all this we will get Michener to write an addendum to his book "Chesapeake" and that you all will be part of that addendum as having really made this major contribution to bringing the bay back.

Senator Mathias will be the lead character in that addendum, and I simply want to make one closing remark. He is leaving the Senate at the end of this year, but no one should relax in the sense that there won't be further hearings comparable to this one and keeping in touch with respect to what is happening in a cleanup effort. We expect Senator Mathias will be the leadoff witness from that side of the table, sort of bringing us up to date on it.

We assume that we will see you again so we can continue to monitor progress on the bay cleanup effort.

In all seriousness what has been achieved is unique. I have worked on this bay question ever since I have been in public life, and we have never reached a point over that some 15 or 20 years where we had established the framework of cooperation at the Federal, State, and local level and with the private sector that exists now. Not only do we have that framework but it is being realized in real actual programs that are taking place, things that no one ever thought would happen before. Farmers are coming to understand that their own self-interest in terms of best management practices fits in very well with the effort to rescue the bay.

So, we have a great opportunity, and it is a very important thing that we are a part of, a very important thing that Senator Mathias has been so instrumental in putting together, and we want to keep pressing it. We don't want historians to look back and say, "Well, you know, they got up there to the top of the hill, and then they let the stone roll back down again." We don't intend for that to happen.

You are all a very important part of that effort.

Thank you, Mr. Chairman.

Senator MATHIAS. Thank you, Senator Sarbanes.

An integral part of the clean-up effort is the Federal establishment, from the President through the departments. We were all encouraged when President Reagan personally endorsed the program in his State of the Union Message several years ago. That kind of commitment has been reflected through the whole departmental structure. We are glad that you are here to give it voice this morning.

I might make one request before we close and that is that after we have had an opportunity to evaluate your full statements and all the testimony, there may be some additional questions. If you don't mind, we will propound those in writing and will include your answers as part of the record.

We have also written statements from the Interstate Commission on the Potomac River Basin,[1] the Izaak Walton League of America,[2] and a statement from Representative Helen Delich Bentley.[3]

These will be made a part of the record.

Senator MATHIAS. The hearing has been concluded and the subcommittee will now recess.

[Whereupon, at 12:50 p.m., the subcommittee recessed to reconvene at the call of the Chair.]

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[1] See p. 336.

[2] See p. 341.

[3] See p. 274.

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

STATE OF MARYLAND
EXECUTIVE DEPARTMENT
ANNAPOLIS, MARYLAND 21404

HARRY HUGHES
GOVERNOR

TESTIMONY
OF
GOVERNOR HARRY HUGHES
BEFORE THE
SENATE SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY AND THE DISTRICT OF COLUMBIA
ON THE FUTURE DIRECTION OF THE CHESAPEAKE BAY CLEANUP PROGRAM
WASHINGTON, D.C.
TUESDAY, JUNE 24, 1986

Mr. Chairman and members of the Subcommittee, I appreciate the opportunity to appear today to discuss what we have been able to accomplish and the challenges ahead for our united effort to restore and protect the Chesapeake Bay. We have made an important beginning. All of us should be encouraged by the initial steps we have taken. I am proud to have been a part to the Chesapeake Bay restoration effort along with my colleagues here at the table. There is no longer a sense of shared frustration but rather a growing appreciation of our collective promise as we take measure of our efforts to revitalize this national estuary.

Our mentor in bringing resources to bear on the Chesapeake's problems has been Senator Mathias. I want to publicly express my appreciation for his leadership and persistence in securing the funding for the Environmental Protection Agency to undertake the six-year, $27 million Chesapeake Bay research program and in overseeing the implementation of its action plan.

Senator Mathias' unwaivering commitment to this cleanup effort is evident today by this very timely hearing, as we complete the initial years of implementation of Federal, State and local strategies to address the Bay's problems. This hearing is most opportune because it prompts us assess the knowledge and experience we have gained over the past three years and to identify the tasks ahead and the issues on the horizon.

This hearing is also timely because we are amidst a period of transition as statewide elections were held last year in Virginia, and are due this year in Maryland and Pennsylvania. New cooperative working relationships and commitments will have to be forged among Federal, State and local officials. The seriousness of purpose, shared interest and comradery among the elected officials who have joined in the "Save the Bay" alliance,has been truly exemplary. Having recently attended a bi-state working session with Governor Balisles, where we discussed Chesapeake Bay topics of mutual concern, I am confident that this spirit of partnership continues and will be sustained.

Finally, this assessment should be helpful because Congressional action is pending on several environmental reauthorization and appropriation bills which will have a direct impact on the future of the Chesapeake Bay program.

Before turning to our accomplishments and the questions ahead, we should acknowledge that the Chesapeake cleanup effort has become a model for estuarine restoration efforts elsewhere in the country. There are several reasons why it has become a national model.

First, the Chesapeake Bay program made a smooth transition from a research effort to a regional intergovernmental management program. The $27 million EPA Chesapeake Bay Study, which documented the Bay's decline because of excessive nutrients, toxic effluents and sediments, provided a solid foundation of research that helped us to identify the issues, pinpoint the problems and tailor strategies to resolve them. While initially designed and focused primarily as a Federal research program, the EPA Chesapeake Bay program evolved into a federal-state management-oriented study responsive to the questions of Bay managers. The Study provided a point of departure for action and the impetus for joint cooperation. In addition, the citizens program component of the Study helped to galvanize public opinion in support of action. This transitional period was greatly assisted by the Fiscal Year 1983 and Fiscal Year 1984 Congressional Appropriation of $900,000 and $4.25 million respectively, which we actively sought. These relatively small appropriations facilitated the creation of the Chesapeake Bay Liaison Office for coodinating our implementation efforts, for monitoring, research and modelling, planning, and data management.

The second reason the Chesapeake Bay effort is looked upon as a national model is that it exemplifies an unprecedented, reinvigorated and constructive intergovernmental interjurisdictional partnership. Three states, the District of Columbia, seven Federal agencies, hundreds of local jurisdictions and thousands of citizens are all working together within an institutional framework which does not take away any authority from the respective parties.

The Chesapeake Bay Agreement which we signed in December, 1983, was just that -- an agreement to work together. The traditional adversarial federal-state-local tensions and regional conflicts have been replaced by a creative collaborative approach which encourages the appropriate governmental action within a cooperative framework. Certainly, the cooperative -- rather than co-optive -- nature is key to sustaining public and private sector support and fostering citizen involvement in the Bay cleanup effort. I believe this creative cooperative approach in large measure, explains our successful beginning.

Perhaps, another reason why the cleanup effort has become a national model is because, in terms of federal dollars, we are a low budget operation. The states have assumed the primary programmatic responsibility; and have accepted the accompanying fiscal responsibility for the cost of increased pollution control, resource restoration and institutional improvement expenditures.

As stated above, Congress provided a $4.25 million appropriation in Fiscal Year 1984 to maintain the Chesapeake Bay Liaison office and to assist the states and the District of Columbia in each of the subsequent fiscal years 1985 and 1986. $10 million has been appropriated for allocation among the Liaison office and the four jurisdictions. This ia a relatively modest federal commitment. For example, while Maryland currently receives $2.7 million in federal cost-share funds for priority non-point source pollution control projects, at the same time, Maryland has annually appropriated approximately $40 million in State dollars for the Bay cleanup with 2/3 of the amount for capital - costs and the remaining 1/3 for operating costs. Since the inception of Maryland's Chesapeake Bay program in 1984, we have committed over $130 million in new State dollars for the restoration effort.

Finally, we are a model because of the extensive monitoring and research activities conducted by our State and Federal agencies and institutions, which have significantly expanded our fundamental understanding of estuarine systems. We now realize estuaries do not follow the conventional patterns of self-cleansing that occur in free flowing surface water bodies. Solutions that are applicable in the Great Lakes where the waters flow from lake to lake and then to the St. Lawrence River are not directly transferable to the Chesapeake Bay. The Bay acts as a sink for the pollutants that are discharged to it. This natural condition makes the clean-up job much more difficult. It also constrains our understanding of the physical, chemical, and biological conditions that exist in the Bay. We have been fortunate to have the funding of the EPA Study, which has also provided us with a massive computerized data base, along with an impressive array of modelling and monitorin tools which will enable us to track the constantly changing characte of the Bay and to further investigate key processes and relationships. Ultimately, we anticipate this long-term monitoring and research program will help us to determine how well our current efforts are working and how to adjust our strategies. It is our hope that much of the knowledge and valuable experience gained from the Chesapeake Bay restoration effort can and will be transferr to assist other stressed ecosystems in controlling pollution and restoring resources in other stressed estuarine ecosystems.

In reviewing some of the crucial steps Maryland has taken down this very long road, I believe it is useful to make a few key observations.

Maryland has taken a holistic and ecological approach to restoring the Bay. One of the themes of my administration has been to look at all of the sources of pollution in a given watershed to analyze the transfer of those pollutants to the Bay and their impacts on water quality and living resources, and then to devise comprehensive and ecologically sound solutions to the problems.

Perhaps our most outstanding example of this theme has been the effort we have undertaken in the Patuxent River Basin to restore the quality of its waters and its living resources. Following a charette in 1981, in which State and local officials and interested citizens participated, we set load limits for nutrients, nitrogen and phosphorus, which were contributing significantly to the Patuxent River's decline. Then we looked at all of the sources of these loads through the efforts of the Patuxent River Commission, and initiated point source control, non-point source contro land use management, and source generation reduction programs to reduce these loads to acceptable levels. Since this effort was initiated, we have educated ourselves and others, and have learned that pollution does not just come from the conventional sources of sewage treatment plants and industrial plants. We have learned that much of it comes from runoff of agricultural land and from our extensive suburban and urban developed areas. We have learned that we have to utilize the wetland transition zones in the Patuxent to serve as filters for pollutions from the land. We have learned that, even if we do all that, we still have problems of pollutants deposited from the atmosphere. We have learned that pollution goes from the surface through the soil to the aquifers and out into our streams. We need to intervene in this pollution cycle to protect our natural resources and the public's health. Now all of these lessons learned from this one watershed are blended into our Chesapeake Bay program.

A second theme is that simple, single thrust strategies to restore the Bay are insufficient. Both incentive and regulatory approaches, as well as experimentation with new responses are needed in our environmental protection and resource management systems.

Finally, the arsenal of laws, policies and programs will help but in the end, it is long-term public support and citizen participation in the Bay cleanup that will make the difference. Seldom have our citizens spoken so loudly. We must remind them that there are no overnight solutions to problems which spanned decades, and moreover, government alone cannot solve the Bay's problems.

What We Have Accomplished

Since we made the firm commitment to cleaning up the Chesapeake Bay a little more than two years ago, several significant and noteworthy accomplishments have been realized. As previously mentioned, we have allocated some 130 million in State dollars. This funding set in motion a unique and comprehensive set of strategies designed to rescue the Bay. Our approach is four-fold, and is based on pollution control, resource enhancement, land management, and institution building. Let me mention a few of the highlights.

- We have completed phosphorus removal of 17 treatment plants in the State of Maryland pursuant to the Upper Bay Phosphorus Policy we adopted in 1978. These plants are treating approximately 217 million gallons per day for the removal of phosphorus, thereby reducing load to the Bay by approximately 10,000 pounds per day, as compared to the 1980 levels. By 1988, nearly 80 percent of the total phosphorus entering the Bay and its tributaries will be reduced, and all 160 publicly-owned treatment plants will be meeting their compliance levels.
- Since 1983, enforcement and compliance activities directed against municipal and industrial plants have more than doubled. In 1985 we collected over $500,000 in penalties.

- We have imposed a moratorium on the taking of striped bass so that we can protect and preserve this important fishery. While there are early signs that this moratorium is beginning to pay off, the most handsome dividends still lie ahead.

- We have installed best management practices on more than 1,700 agricultural cost-sharing projects, utilizing some $4 million in State bond funds. This effort, too, will dramatically reduce the phosphorous and other chemicals attached to the soil, along with bacteria and some nitrogen, from entering the Bay.

- Bay grasses have been planted on the Choptank River and Susquehanna Flats, and they are thriving.

- We initiated an oyster shell planting program, which has resulted in a record high oyster "spat" in 1986, reversing five years of decline.

- We have enacted a ban on the use of phosphates in detergents to help reduce nutrient discharges to the Bay system.

- The Chesapeake Bay Critical Areas Commission has developed criteria which have been approved by the General Assembly to guide local officials in limiting future, development and in protecting resources along the shoreline areas of the Bay and its tributaries - a pilot piece of legislation.

- We have, in connection with other states and the U.S. Environmental Protection Agency, established an extensive monitoring program throughout the Bay to measure how our water quality and our living resources are changing as we implement our initiatives, and the effectiveness of our efforts.

What Remains To Be Done

Our work on the Bay is still in its infancy. We are committed to continuing and summoning even more resources, to get the job done. We will not see results to any great extent by 1988. Most of our programs have been truly underway for a little more than one year.

The interrelationships among nutrients, transport, algae growth, the reduction of light to summerged aquatic vegetation (SAV), the covering of the leaves of SAV's, transport, dissolved oxygen depletion, and the resulting impacts on living resources are not going to be reversed until our pollution abatement programs are reducing loads. Most fresh water bodies take 5-10 years to respond: Chesapeake Bay, because it is an estuary, will take even longer. Many problems have not been solved. We do not have all of the answers, we need to define additional pollution abatement measures. For example, we have not fully defined the nutrient relationships in the Bay and specifically the extent to which transport of nutrients and regeneration of nutrients from the bottom sediments contribute to the algae problems and, subsequently, to the dissolved oxygen problems.

I want to say a few words on "target loadings" for nitrogen and phosphorus. I recently signed Senate Joint Resolution #18 which asked the Executive Branch to designate "suggested" target loads for these nutrients. I want to be clear on what we believe a "target load" and what it is not. It is not a quantifiable load at which point we have restored the Bay's water quality and the productivity of its living resources. We don't know now what those "target loads" are. We may know them after we complete the 2-3 years of modeling which the Chesapeake Executive Council is undertaking. However, a "target load" is a milestone along the way to restoring the Bay, a step in the right direction which we will strive to achieve by a date certain. It seems appropriate that, in the absence of "target loads" which equate with "success", we take the best steps we can in that direction. For this reason and with this understanding of "target loads", I have directed my Council on the Bay to prepare "suggested target loads" by the end of this year for each of the major tributaries in Maryland.

There is a need to improve our understanding of the role of nitrogen in the Chesapeake Bay system. Scientific uncertainty continues as to whether nitrogen is limiting and, if so, where and how to remove it.

Maryland is pursuing an integrated program including research and modelling components which will help to further address and perhaps, answer many of these questions. In the Patuxent, where nitrogen is of substantial concern, we anticipate that over 30 percent of nitrogen flowing from sewage treatment plants will be removed by 1990. This is an experimental control program, being entirely funded by the State, at a cost in excess of $20 million.

In addition, we are seeking to undertake less expensive biological nitrogen removal, at some of the smaller plants in the Patuxent Basin. Considering the potential impact this technology can have in our overall nutrient control strategy, the technical questions relating to its application need to be fully evaluated. We are hopeful that this work can be included as part of Maryland's Fiscal Year 1986 Chesapeake Bay implementation grant.

We have not determined the extent to which toxics are taken up in the food chain, and, thereby, need to be controlled. While enhanced bio-monitoring and bioassay studies will enable us to control toxics through individual permits, and implementation of pretreatment programs, more attention to toxic control strategies is needed.

We have not come up with good answers to the question of how we would go about controlling land use and urban sprawl in the State, although we have taken significant steps with our Critical Area, Agricultural Land Preservation, and the Maryland Environmental Trust Easement Programs.

One of the biggest questions facing the State is funding for sewage treatment facilities. The President is proposing to cut construction grants and limit the Federal exposure to $6 billion. Maryland, therefore, would receive, in Fiscal Year 1986 through 1990, a total of $150 million in construction grant funds. However, at the present time, our projected needs, just to meet the municipal enforcement requirements of the Clean Water Act, are estimated at $366 million. In short, Maryland needs $216 million in Federal funds for the next five years to meet the goals of the Act and to reduce nutrients and toxics being discharged to the Bay. We urge the Congress to extend the construction grant program for at least six more years as a grant program at the $2.4 billion level. Further, we support the phasing of a Federally-funded State revolving fund at the $600 million level through Fiscal Year 1992. Shortly, I will create a task force to establish such a fund in Maryland.

We have supported provisions, in the House and Senate versions of the Clean Water Act amendments, requiring States to submit nonpoint source programs and providing for a modest $70 million to $130 million a year nationwide incentive program to states to operate non-point source programs. We prefer the Senate language which would allow flexibility for the states to undertake some demonstration projects with these funds.

Another funding issue of paramount importance, is the continuation of the EPA Chesapeake Bay Program. EPA must be a full partner in the Chesapeake Bay cleanup effort. EPA's authority under the Clean Water Act - their oversight of the State's NPDES program, their backup enforcement authority, their approval authority of construction grants projects, their approval authority of water quality standards and wasteload, their approval authority of State non-point source programs - these are all examples of why EPA's role must continue. Moreover, the EPA Liaison office's role in Baywide monitoring modelling research and regionwide citizen participation is critical to the cleanup effort. We urge the Congress not to limit the continuation of this program just through Fiscal Year 1988. It will take us at least through 1989 to complete the several steps of the Phase II planning process.

We believe the Phase II process, as designed by EPA and supported by the Chesapeake Executive Council, will address questions which were not addressed by the Chesapeake Bay Program's reports in 1985. From the Phase II effort, we hope to further refine water quality standards and water quality criteria, to discern new technologies for removing pollutants both from point and non-point sources and to get a better handle on the cost of implementing such technologies and paying for them. The Phase II process has, and will continue to dictate new areas where inter-agency coordination and management are necessary.

A crucial part of the Phase II planning process is the identification of objectives and habitat criteria for living resources, including fish, shellfish, submerged aquatic vegetation, and waterfowl. For the present, we have put together a framework of coordinated research, monitoring and management for living resources in the Chesapeake Bay. With partial support from the Federal government, the states have programs in place to monitor populations, recruitment, survival of early life stages in relation to habitat conditions, and to enhance stocks of finfish and oysters. Interstate grants from NOAA have been particularly helpful in the areas of fisheries stock assessment, extension of juvenile surveys to Virginia tributaries, habitat monitoring, and data management. Some of these programs could benefit from expanded scope, and small enhancements of Federal funding, particularly throught interstate grant mechanisms, could make them truly comprehensive. Through the Phase II planning process, important topics for research and new initiatives will be identified. For these reasons, we continue to seek a long-term commitment as contained in the multi-year Chesapeake Bay Program authorization in the amendments to the Clean Water Act now pending in conference committee.

It should also be emphasized that there are numerous other Federal programs which need to be continued to supplement our efforts to meet our Chesapeake Bay restoration goals. A few notable examples include:

> U.S. Department of Agriculture, Soil Conservation Service and Agricultural Conservation Program which provide technical and financial assistance for establishing agricultural best management practices in the critical areas of the Bay watershed;
>
> U.S. Department of Commerce, National Oceanic and Atmospheric Administration's Chesapeake Bay Study and Coastal Zone Management Program which have provided scientific research, technical and financial assistance to conserve the living resources and protect valuable habitat; and
>
> U.S. Corps of Engineers funding to study shoreline erosion, sedimentation and drought managment.

These programs and many of the activities of other individual federal agencies are part of the cooperative agreements, designed to enhance federal participation in the Chesapeake restoration and protection effort. Identification of these programs along with specific recommended funding levels are detailed in my recent correspondence to the Maryland Congressional delegation which I will submit with my testimony.

With regard to institutional improvements, I believe that the Chesapeake Executive Council and the Implementation Committee structure continues to be the best mechanism for coordinating the myriad intergovernmental and interstate agencies involved in the Bay restoration effort. Programs which make substantial contributions to the body of knowledge concerning the impacts of environmental and man-induced changes on living resources, habitat and water quality should be continued and strengthened. Ultimately, we need to bring state-of-the-art technology and science together with our managment needs. We urge, therefore, that the three major federal agencies -- the Environmental Protection Agency, the National Oceanic and Atmospheric Administration and the National Science Foundation -- establish a joint initiative on estuarine research.

In conclusion, the effort to protect and restore the water quality and living resources of the Chesapeake Bay has issued a challenge to the human spirit. We are summoned at once to be innovative, pragmatic and progressive. It will take all the dedication and cooperation we can muster. We are meeting that challenge and, in the end, we will not only have restored this national treasure, but will have also brought forth the best qualities in our citizens, communities and governmental institutions.

COMMONWEALTH of VIRGINIA

Office of the Governor

Richmond 23219

Gerald L. Baliles
Governor

September 8, 1986

The Honorable Charles McC. Mathias, Jr.
United States Senate
Washington, D. C. 20510

Dear Senator Mathias:

Thank you for your letter of July 21, 1986, and for the opportunity to offer additional testimony as a follow-up to my presentation at your June 24 hearing.

The nine questions you pose deal with some very provocative issues. They raise points we will all have to consider very carefully as we move ahead with our various programs and projects to restore the health and productivity of the Bay. While it may be premature to attempt definitive responses to all of your questions now I, nevertheless, would like to offer observations on some of them.

One of your questions deals with the idea of targeting specific strategies to "selected tributaries." This clearly makes sense. Virginia recognized this concept from the beginning of its initiative program and is now following this targeting approach on two levels. On a small scale, we are conducting comprehensive runoff control programs in two individual watersheds, one in the coastal plain and the other in the Piedmont, accompanied by intense before-and-after monitoring. On a larger scale, we are emphasizing different mixes of programs in different tributary basins, depending on the sources of the problems in each.

Regarding the targeting of EPA's $7.2 million grant monies, there may be too narrow a focus already. By targeting these funds almost exclusively for non-point controls, EPA is ignoring half the source of the Bay's nutrient problem. Given the complex mix of pollution sources which vary substantially from one tributary to the next, it seems appropriate that any formula for allocating the federal funds among the states allow them to do the appropriate targeting within their jurisdictions.

Several of your questions deal with toxics, another issue that is receiving a great deal of attention within Virginia's Chesapeake Bay initiatives program. Over the last several years, industrial permits have been reviewed and discharges into Virginia waters have been put under toxic controls where necessary, including requirements for biological monitoring, as part of their permit conditions. In addition, we are implementing a Pilot Toxics Strategy Initiative designed to detect and trace toxic contamination. This project has focused on the James and Elizabeth Rivers this past biennium and will expand to other basins this year.

Two of your questions deal with land use. There is no denying that what happens on the land affects the water. In terms of strategy, one can attempt to control the land itself (as in Maryland's Critical Area program) or focus controls on the specific offending activity, such as discharges of waste, runoff, or destruction of marshes. Most of the Chesapeake Bay initiatives being undertaken in all the Bay states fall into the latter category. Consequently, it will be especially interesting to watch the results of Maryland's Critical Areas controls over the next several years to assess their effectiveness. Meanwhile, there is a growing recognition among many Virginia local governments of the responsible role they can play in protecting water quality from the effects of uncontrolled shoreline development. Through our coastal resource management program, we will be making additional funds available to these local governments to assist in these efforts.

I am enclosing two documents for your further information. One, the first annual progress report on our Chesapeake Bay initiatives, was published last September. While most of the figures reported have improved since then, it nevertheless shows the basic direction our program is taking and describes all of the individual projects. A second annual report will be published this fall. For more up-to-date figures now, I am also enclosing a draft copy of the soon-to-be-published final quarterly status report for the 84-86 biennium. This is the report we use for our own internal monitoring of our initiative program, which involves ten different agencies in five different Secretarial areas, and includes 31 projects funded at over $17 million. An additional $21 million has been appropriated for the current biennium, plus another $20 million for our new revolving loan fund for sewage treatment plant construction.

I hope this information is helpful to your understanding of Virginia's part in the efforts to restore the Bay and of our deep commitment to the ultimate success of these endeavors. Again, thank you for the opportunity to offer these additional comments.

With kindest regards, I am

Sincerely,

Jerry Baliles

Gerald L. Baliles

GLB/km
Enclosures
cc: Mr. Keith Buttleman

WRITTEN TESTIMONY OF MARION BARRY, JR.
MAYOR, DISTRICT OF COLUMBIA

RESPONSE TO QUESTIONS OF CHARLES McC. MATHIAS, JR., CHAIRMAN, SENATE SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY AND THE DISTRICT OF COLUMBIA

1. The authorization for the Chesapeake Bay Program expires in 1988, but the restoration effort will take years. What do you see as the federal role in the Bay restoration effort beyond 1988? Do you see a need for a Bay re-authorization bill beyond 1988, and if so, what form?

The District of Columbia would urge a continued federal role in the Chesapeake Bay cleanup effort through re-authorization of the Chesapeake Bay implementation grants to the states beyond 1988. We feel that the program should be re-authorized at $13 million per year, and include an increase in funding to the Environmental Protection Agency's (EPA) Chesapeake Bay Liaison Office (CBLO).

The federal-state partnership, through the CBLO, is crucial to the Bay restoration effort. We would strongly recommend an increased funding level for the CBLO to ensure that the states involved in the Bay cleanup are adequately supported in the implementation of the control programs under the phase II process. The Liaison Office provides vital coordination in the areas of research, monitoring and data collection, and logistical support to the Executive Council and the various Bay committees. The Office represents a centralized resource that would have to be duplicated by the states and the District of Columbia if it is abolished, risking a disruption of this central function.

In its Bay restoration efforts, the District also benefits from the support offered by the National Oceanic and Atmospheric Administration (NOAA) through its Chesapeake Bay Stock Assessment Program. The NOAA funding accelerated the establishment of the scientific information on the status of migratory fish populations in the District. This effort was coordinated through the Stock Assessment Committee and resulted in the first Bay-wide collection of compatible data. In order to understand the long-term trends of the Chesapeake Bay fish populations and the effects of current restoration programs, we recommend that NOAA funding be re-authorized for the same period as the EPA Chesapeake Bay Program.

2. Regardless of whether or not there is a re-authorization bill, how do you plan to integrate your program into phase II of the Implementation stage? What federal funding and program resources will you need to effectively accomplish your objectives in phase II?

The District's phase II efforts will continue to be coordinated through a number of programs. The fisheries program is involved with the Stock Assessment Committee and the Striped Bass Advisory Board of the Atlantic States Marine Fisheries Commission, and is promulgating regulations compatible with those of the Bay-wide effort to protect migratory species. Water pollution control efforts for the point sources on the Potomac estuary are coordinated through the Potomac Strategy Management Committee which is basically a subset of the Chesapeake Bay Implementation Committee. Management decisions and actions through the rest of this decade will carefully consider the ramifications of phase II and will build into the Potomac strategy framework sufficient flexibility to incorporate the broader and perhaps different needs of the main Bay.

Nonpoint source control efforts in the District are being coordinated with Maryland under the Anacostia Watershed Restoration Strategy Agreement and through the Chesapeake Bay Nonpoint Source Subcommittee. Because the nonpoint source pollution problem in the District is basically urban runoff, it is not expected that phase II will materially affect the program other than by focusing it on specific pollutants.

Unanticipated reductions of funding disrupt the flow of resources, causing shifts in programs and goals. The proposed federal grant cuts under Gramm-Rudman for the water pollution control activities will make it difficult to maintain even the current level of activities. Activities such as data collection, analysis, and data management, necessary for planning and monitoring the bay cleanup efforts, will be adversely impacted.

Perhaps the most unfortunate situation is the impending phase out of the EPA construction grants program simultaneous with the realization of the need for a massive nutrient reduction program. While provisions may be made for a revolving loan fund, this does not provide for the unique situation found in the District of Columbia. A revolving loan fund from one District agency to another is only a paper shuffling exercise which wastes money. We believe that the phase out of the construction grants program would cause serious problems with the implementation of any Bay-wide nutrient reduction strategy.

We recommend that Section 106 Water Pollution Control funds be stabilized at the FY 1986 level. The Chesapeake Bay Program should be re-authorized at the $13 million per year level, and the NOAA Stock Assessment Program should be re-authorized through 1992.

3. Are there specific interim nutrient-reduction goals that can be implemented within the next year for point and nonpoint sources of pollution? If so, what should those goals be and how can they be implemented?

In the upper Potomac estuary, interim nutrient reduction goals for phosphorus control from point sources have been agreed to by EPA, the District, Maryland and Virginia. Within the next year, the development of nonpoint source nutrient reduction controls should be implemented.

While we recognize the plight of the agricultural community, we believe that the days of voluntary nonpoint source control are over and that federal legislation should require nonpoint source control just as with point sources.

4. **What immediate new initiative could be undertaken to supplement the phase II action plan?**

All possible new initiatives that could be undertaken are being considered in the phase II process. Additional monitoring, modeling and research should be undertaken before identifying any other new initiative not presently considered in the phase II plan.

5. **How will living resources and habitat protection concerns be incorporated into phase II objectives? What research or initiatives on living resources and habitat protection are needed to meet phase II objectives? What are the future funding needs in this respect?**

Phase II plan development includes assessment of living resources and habitat requirements. Additional research and monitoring are needed to identify water quality conditions conducive to the preservation and protection of living resources.

The District has initiated a fisheries management program to incorporate living resources considerations into water pollution control efforts. While habitat protection must be maintained, we feel that the major effort must be focused on habitat restoration. Numerous physical barriers exist between the tidal estuary and the free flowing streams which effectively reduce the available spawning and nursery areas for migratory fish. As a part of the NOAA Stock Assessment program, we have gathered valuable information on the reproduction and abundance of migratory fish. This information can be used to design a restoration program for migratory fish. American shad and striped bass historically spawned in and above the District, but the spring runs of these species became nonexistent in the District during the 1960's. Preliminary results from the work performed under the Stock Assessment Program indicate that there are presently few American shad in the District during the spawning period and it is not known whether the numbers are increasing or decreasing. It will require several years of study to document these trends, to assess the reasons for the trend and to initiate any necessary restoration programs.

In the case of the Anacostia River, the Combined Sewer Overflow Abatement Program and nonpoint source control program will result in tremendous improvements in water quality which in turn will restore this portion of the estuary to suitable habitat.

Additional funds are necessary to carry out the above studies.

6. **How will you integrate into phase II toxic or other harmful substance contamination of surface and ground waters of the Bay area?**

The District is addressing the toxic issues through the development of a pretreatment program and the addition of dechlorination at the Blue Plains Wastewater Treatment Plant. In addition, the District will be promulgating storm water management regulations. These regulations will reduce the amount of toxics which enter the Bay system via runoff from the District.

Chesapeake Bay Implementation grant funds will be used to construct demonstration projects for storm water control, thereby reducing both toxics and nutrients. Due to the lack of established criteria of toxics in the sediment, it is difficult to determine a final goal for the control programs.

The issue of toxic substances in the sediment is continually raised, but no firm cause and effect relationship is available. EPA should establish criteria for toxics in sediment to enable the states to relate the criteria to living resources indigenous to the area.

The District is planning to conduct a comprehensive groundwater assessment to determine the extent of the groundwater problem. Additionally, the District has initiated a program for correcting leaking underground storage tanks.

7. **With any complex management structure, as in the Bay cleanup program, there is always room for improvement. How can the present coordination and Executive Council management structure be refined?**

The Chesapeake Bay partnership is an evolving process which is now maturing. The phase II process will bring everyone along a common path, yet allow the flexibility of responding to specific area issues. There is still a need to improve the Implementation Committee's capabilities in focusing issues for the Executive Council in a manner that enables the Council to respond effectively.

There is also a need to reduce Executive Council response time to issues brought before it. Perhaps a mechanism needs to be developed for decision-making between the scheduled quarterly meetings.

8. **From your perspective, how can the federal government encourage greater local government participation in the Bay cleanup process?**

The District of Columbia is in a unique situation, having the status of both a state and a local government. The Federal government can encourage local involvement by inviting local officials to public forums and meetings to discuss the conditions of the Bay and by providing more public information and technical assistance to focus public interest on the Bay restoration programs.

THE DISTRICT OF COLUMBIA
WASHINGTON, D.C. 20004

MARION BARRY, JR.
MAYOR

September 12, 1986

The Honorable Charles McC. Mathias, Jr.
United States Senate
Washington, D.C. 20510

Dear Senator Mathias:

In your letter of July 21, 1986, additional questions were transmitted concerning the testimony presented at the June 24, 1986 hearing before your Subcommittee. The District's responses to your questions are outlined below.

1. What steps are being taken to scientifically measure the effects of nitrogen control on the living resources of the Potomac River and the Chesapeake Bay?

Over the past ten years, the District of Columbia has focused its nutrient control strategy on phosphorus removal. A recent study by the Chesapeake Bay Scientific and Technical Advisory Committee (STAC) has identified nitrogen control as the critical nutrient to control in a saline environment.

As you are aware, the State of Maryland is proposing several demonstrations of biological nitrogen removal in the Patuxent River, while the Commonwealth of Virginia is testing this technology at Hampton Roads. We will monitor these experiments and assess their applicability in the District. Members of the D.C. Department of Public Works water and sewer utility staff have met with Dr. Clifford Randall, author of the STAC report, to obtain more details of the report's findings. Also, the governments of the Washington metropolitan region commissioned a study of dissolved oxygen levels in the Upper Potomac estuary; this study will assess water quality issues in the Potomac River.

We believe it would be preferable not to modify our nutrient control strategies until after we receive more detailed information from the two-dimensional (2-D) and three-dimensional

(3-D) models which are being developed under the auspices of the Chesapeake Bay Implementation Committee. The data that is collected through these models will provide details about specific pollution loads and their impacts in the Bay and in tributaries.

In Summer 1987, an interim report will be issued using the 2-D model to evaluate alternative control strategies. When the 3-D model is available, a final control program will be developed. More information from the ongoing demonstration projects, current studies, and modeling efforts will enhance our abilities to properly identify problem areas and to better shape our nutrient control program.

2. Should there be changes to the National Pollution Discharge Elimination System (NPDES) permit system and enforcement policies for activities that pollute the Bay? Is there anything we can do to tighten NPDES discharge limits on nutrients and toxics prior to establishing new criteria and standards in a few years?

Our experience has been that the current NPDES permit system is an effective control mechanism. Through the recently enacted District of Columbia Water Pollution Control Act, we are attempting to complement the NPDES system in controlling point source discharges to rivers and tributaries. We feel more information is needed before major changes are implemented. We also believe that the U.S. Environmental Protection Agency should focus additional attention on developing standards for the control of non-point sources of pollution.

3. What land use strategies should be instituted to address population growth in the Bay region?

The District's population is relatively stable, the environment is predominantly developed, and most of the land adjacent to the rivers is federally owned. At this time, the District does not intend to develop any specific land use controls, but will continue to implement its soil erosion control and combined sewer overflow programs to minimize the impact of development on the Potomac and Anacostia Rivers.

4. Should there be a Bay-wide strategy for toxics control?

The District has water quality standards for toxics control. Furthermore, a pretreatment program has been developed by the District, and new dechlorination facilities are being added at the Blue Plains Wastewater Treatment Plant to reduce the release of toxics into our rivers.

The District does not have a large industrial sector which produces toxic wastes. Because of the variances throughout the Bay drainage basin, we believe each state should develop their own toxic control program based upon their specific needs.

5. Should we develop a toxics action plan or Toxic Geographic Areas of Concern to deal with toxics in the Bay?

A Toxic Geographical Areas of Concern plan, similar to the one designed under the Great Lakes Agreement, may prove useful for the Chesapeake Bay. However, we would like to get more information on the Great Lakes Agreement in general and this plan specifically. It is my understanding that the Environmental Protection Agency is arranging a presentation on the Great Lakes Agreement for the October Executive Council meeting.

6. Should Chesapeake Bay grant monies be targeted to more specific areas of critical need around the Bay?

If it is determined that the needs of the Bay can be better addressed by reallocating this funding, then changes should be made. In Spring 1986, approximately a dozen different criteria were proposed to determine "areas of critical need." The decision then was to continue with the present split of 30-30-30-10. This earlier discussion revealed that a definition of the criteria for determining priority areas of need would not be easy and not be agreed to by all program participants. We would suggest that at a minimum, each participant should be guaranteed ten percent to ensure that all signatories of the Chesapeake Bay Agreement can continue to participate in the program.

I appreciate this opportunity to expand upon our prior testimony, and look forward to our continued joint efforts to restore the Chesapeake Bay.

Sincerely,

Marion Barry, Jr.
Mayor

Commonwealth of Pennsylvania
Department of Environmental Resources
Harrisburg, PA 17120

The Secretary

September [illegible], 1986

(717) 787-2814

Honorable Charles McC. Mathias, Jr.
United States Senator
United States Senate
Washington, DC 20510

Dear Mac:

Governor Thornburgh requested that I respond to your letter of July 21, 1986. I am pleased that the testimony that Deputy Secretary William Cook presented on behalf of Governor Thornburgh at your June 16, 1986 hearing on the Chesapeake Bay clean-up program assisted in determining a proper future course of action. I am also pleased to provide the following responses to the issues in your July 21, 1986 letter.

- Unlike the states of Maryland and Virginia, Pennsylvania has one "selected tributary", the Susquehanna River. Our entire program concentrating on nonpoint source controls has targeted the lower Susquehanna as Pennsylvania's area of greatest contribution of nutrients to the Chesapeake Bay. We have been working with the county conservation districts and the Pennsylvania Farmer's Association to implement our education and cost share programs in the basin. Additionally, we have been working with the Susquehanna River Basin Commission and the U. S. Geological Survey to measure the before conditions and the after benefits from the installation of best management practices on agriculture lands. As we achieve a high rate of conservation practices in areas of high nutrient runoff, we will expand our program into other counties in the Susquehanna basin.

- Pennsylvania has been using the NPDES permit system effectively for many years to regulate point source nutrient contributions to the Susquehanna River and ultimately to the Bay. For point source discharges of nutrients in the lower basin, we have required phosphorous removal since the 1970's. Recent modifications to the state's water quality regulations allow a greater implementation of the phosphorus policy through our NPDES permit system. Additionally, Pennsylvania has developed and implemented a toxic strategy under the NPDES system that prohibits the discharge of known carcinogens and establishes goals and toxic evaluation strategies to reduce their states' intimate relationship to the Bay proper. Their efforts to develop strategies to work with local governments will be of a critical nature in the preservation of the Chesapeake Bay. Pennsylvania is a state of strong local involvement, and we believe that our current voluntary program with farmers to implement best management practices reflects our best strategy for achieving results.

* Toxic substances are an issue of great concern whether they are in the Chesapeake Bay or the waters of Pennsylvania's streams. As I indicated earlier, Pennsylvania has implemented a toxic strategy under the NPDES permit system. That strategy has been recognized by the U. S. Environmental Protection Agency (EPA) as one of the best in the country, and we would be glad to share it with our state partners in the Pennsylvania clean-up effort should they so desire.

* Under the NPDES permit system, dischargers are required to identify all the constituents of their effluents. It is through this means that Pennsylvania has been able to implement its toxic strategy, and it is through these permits that the discharge of toxics can be controlled.

* For the last two years, the $7.2 million of EPA grant monies, devoted to Chesapeake Bay clean-up, have been distributed by a ratio determined by the Chesapeake Bay Executive Council. That ratio, as does the Council, reflects full recognition of the equal partnership that has been developed to protect the water quality and resources of the Chesapeake Bay. Consideration of other distribution percentages is an issue that is best addressed by the Executive Council with full discussion and understanding by all state participants. The Soil Conservation Service has traditionally provided resources to areas of need. It is hoped that they would continue to do so, and that as Maryland, Virginia, and Pennsylvania continue their efforts to abate nonpoint source problems that the Soil Conservation Service would still be cooperative.

I hope this additional information is helpful in preserving this important estuary. I thank you for the opportunity to make constructive input.

Sincerely,

for Nicholas DeBenedictis
Secretary

STATEMENT OF
LEE M. THOMAS
ADMINISTRATOR
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY AND
THE DISTRICT OF COLUMBIA
COMMITTEE ON GOVERNMENTAL AFFAIRS
UNITED STATES SENATE

JUNE 24, 1986

Mr. Chairman and Members of the Subcommittee, it is a pleasure to appear before you this morning to talk about the Chesapeake Bay Program, its past, present and future. In particular, I want to discuss the progress made to date under this program and the future role of the Environmental Protection Agency in water quality management of the Bay. Accompanying me today is EPA Region III Administrator James Seif, who is the chairman of the Chesapeake Executive Council.

The Chesapeake Bay is a National Treasure.

Those of us living and working in the Nation's capital are privileged to have the opportunity to enjoy both the beauty and the bounty of one of the largest, most productive estuarine systems in the world. Its harvests are legendary, producing oysters, crabs, and other commercial species prized in domestic and foreign markets. In addition to the riches from its waters, the extensive shoreline and wetlands provide a home for countless animals and plants, and are a major stop along the

Atlantic Migratory Bird Flyway. The Chesapeake supports a fisheries and wildlife population virtually unmatched by any other estuary.

The Bay itself is enormous, stretching more than 200 miles from north to south and between 4 to 30 miles in width. It has more than 2,500 square miles of surface area and drains 64,000 square miles of watershed. More than 150 creeks and eight major rivers empty into the Bay. The Bay area is also home to nearly thirteen million people, many of whom depend upon the Bay for recreation or livelihood, or both. The population in the Bay area has grown by about 50% since 1950, and is projected to grow another 15% by the year 2000.

Developing the Chesapeake Bay Program.

The clean, pristine estuary known to Captain John Smith no longer exists. Indeed, the Bay has experienced profound changes as a result of increasing population and land usage along the main stem and Bay tributaries. The incalculable value of this national treasure and the increasing stress placed upon it by population growth as well as both industrial and agricultural development have been recognized since the beginning of the nineteenth century. A number of conferences to address these concerns have been held (1933, 1968, and 1977) and individual states and citizen groups have been active voices of concern for the health and welfare of the Bay.

Specific impetus for the Environmental Protection Agency's Chesapeake Bay Program, enacted as part of the 1976 Appropriations

Bill, is the direct outgrowth of your interest and efforts, Mr. Chairman. The Chesapeake Bay Program as envisioned by the Congress was a federal/state partnership. I believe the Agency demonstrated its dedication and commitment to the program by working to unify the various and often disparate interests of federal and state agencies as well as the scientific community throughout the Bay region. I intend to reinforce, both now and in the future, the momentum and cooperative spirit which EPA's leadership fostered.

Although each state implements programs to meet the requirements of its own statutes and regulations, the states and federal parties are working together to attain their mutual goal of protection and restoration for the Bay. The policy for the Bay Program study was guided by a Management Committee, comprised of senior representatives from EPA, the states of Virginia, Maryland, Pennsylvania, and the District of Columbia. A critical component of the Management Committee was the valuable assistance received from the active participation of public advisory committees. The goals established by the Congress and addressed by this Management Committee were:

- to define the environmental problems;
- to explore the causes of identified environmental problems;
- to build a Chesapeake Bay environmental information data base; and
- to recommend alternatives to mitigate the environmental problems.

These goals were met by EPA and the states working together. From 1978 to 1982, the problems of the Chesapeake Bay were examined with the assistance of scientists from all parts of the country. Among the most critical problems identified were declines in living resources, significant increases in nutrient levels, and high concentrations of toxic pollutants in certain areas of the Bay.

Based upon this identification of the environmental problems, which can be broadly categorized as nutrient and toxic pollutant concerns, we examined both point and nonpoint pollutant sources. To give you an idea of the scope of this effort, there are over 2,700 direct dischargers into the Bay, with runoff from urban and agricultural areas contributing heavily to the nonpoint source problem. Specific control strategies were recommended to protect and restore the environmental quality of the Chesapeake Bay. These recommendations were contained in a report entitled "Chesapeake Bay: A Framework for Action" produced by the EPA in September, 1983. That report recommended:

- the institution of land use controls at or near the Bay shoreline;
- development of nonpoint source control programs for agricultural and urban sources;
- continued and expanded control of point sources, particularly municipal treatment plants; and
- the strengthening of wetlands protection laws and programs.

Establishment of the Chesapeake Bay Agreement.

It now appears that 1983 was the year of reckoning for the Chesapeake Bay, Mr. Chairman. The alarming findings of the Chesapeake Bay Program report prompted public concern and a call for immediate action from both federal and state leaders. In December of 1983, the Governors of Maryland, Virginia and Pennsylvania, as well as the Mayor of the District of Columbia, and the Chesapeake Bay Commission signed what is known as the Chesapeake Bay Agreement with then-EPA Administrator William Ruckelshaus. The Agreement commits the Agency and the States to prepare and implement plans improving and protecting the water quality and living resources of the Chesapeake Bay. As Mr. Ruckelshaus said, "I trust the Bay to do its part in recovery if we do ours. The tough thing will be to make certain that we are steadfast, year after year, decade after decade. The start we have made is a cause for optimism."

That optimism found expression in the spirit of cooperation and commitment made by both the states and the federal government to protect and restore the Bay by working to keep wastes out of it. For my part, Mr. Chairman, EPA remains committed to that effort.

EPA Commitment to the Bay Agreement.

The Environmental Protection Agency plays a key role among the several federal agencies having an interest in Chesapeake Bay Agreement activities. During 1984, the Agency negotiated agreements with six federal agencies to enlist their cooperation, resources and expertise in the Bay cleanup. These agencies include the Fish and Wildlife Service, the Soil Conservation Service, the National Oceanic and Atmospheric Administration, the Army Corps of Engineers and the U.S. Geological Survey. EPA itself has committed $40 million dollars specifically to the Bay program beginning in fiscal year 1985 and continuing through 1988.

This federal funding is in addition to substantial funding and resource commitments from the on-going programs such as the Clean Water Act, RCRA and Superfund which make valuable contributions to the overall clean-up efforts focused on the Bay. I will address this aspect of the Agency's efforts momentarily. However, with respect to the Bay program itself, the Chesapeake Bay Liaison Office (located in Annapolis, Maryland, and a part of our EPA Region III Office) is charged with the responsibility for the administration of the Chesapeake Bay Program funds. The Liaison Office also contains our data center for Bay information. The 1983 Chesapeake Bay Agreeement established the Executive Council, which assesses and oversees the implementation of coordinated plans to improve and protect water quality and living resources of the Bay system. The Council is chaired by EPA Regional Administrator James Seif and has two Cabinet-level representatives from each of the three states and the District of Columbia. The Council works through its Implementation Committee and subcommittees.

Each year, about $7.25 million of the Chesapeake Bay Program's annual federal commitment of $10 million is put into cost-sharing grants to the states to implement the recommendations of the 1983 Bay study. The participating states must match federal funds on a 50/50 basis.

Beginning in 1984, the legislatures of Maryland, Virginia and Pennsylvania appropriated new funding to implement the recommendations of the Bay program. Using the 1983 study recommendations as a guide, we have encouraged the States to use these funds to initiate and develop long-range nonpoint source control programs, particularly cost-sharing programs with agricultural communities for the implementation of best management practices (BMPs). Nonpoint source agricultural loads are a significant problem in the Bay. We have found that the majority of farmers are willing and eager to participate in this program.

Additionally, EPA has used the Chesapeake Bay Program as a pilot project for assessing alternatives to control nonpoint source pollution. The District of Columbia, Maryland and Virginia have also added programs for urban stormwater.

Over the last three years, the federal government has directed nearly three quarters of all federal funds -- over $17 million -- to these programs. Matching state and local funds doubled the federal contribution, to a total of of $34 million in the last three years.

State Commitment to the Bay Agreement.

For the period from 1984 - 1986, the state of Maryland created forty new programs, hired 174 new employees, and appropriated $13.8 million in operating funds and $22 million in capital funds for point and nonpoint source controls, resource management and land use planning. One example of this progress is that by 1988 nearly 80% of the wastewater discharged from facilities in Maryland will receive treatment for phosphorus.

Virginia appropriated $15.0 million for the same purposes. Pennsylvania appropriated $2.0 million for comprehensive agricultural nonpoint source pollution control programs in the Susquehanna River Basin.

Progress to Date.

Solving the Bay's problems means striking a delicate balance among the many competing interests for use of the Bay and its tributaries. State and federal programs are directed to control both toxics and nutrients, as well as to measure the effectiveness of those controls.

The major sources of toxic pollutants are industrial facilities, federal installations, agricultural activity, and municipal sewage treatment plants. In addition, runoff, both urban and agricultural, contributes heavily to the problem. The most troublesome toxics in the Bay are those materials that do not quickly deteriorate, instead ending up in the bottom sediment, where they remain a source of pollution. Research shows a direct relationship between elevated levels of toxic compounds in sediments and the survival of individual organisms necessary to a balanced Bay ecology.

Nutrients like phosphorus and nitrogen are also a serious threat to the health and welfare of the Bay. They encourage excessive algae growth which uses oxygen and blocks out sunlight. This in turn has contributed to a significant decline in submerged aquatic vegetation through out the Bay. The recent loss of this vegetation is unprecedented in the Bay's history and has led to reductions in the harvests of fish and shellfish.

While this may be a somewhat abbreviated view of the problem in the Bay, it accurately sketches the challenge facing all levels of government. Keeping the wastes out of the Bay is a challenge, and it is not a small one. To that end, the largest ongoing EPA contribution to address this challenge comes from the construction grants program under the Clean Water Act. The construction grants program has committed over $2.44 billion since 1965 to sewage treatment plant construction on the major tributary rivers of the Bay watershed. There are about 900 major commercial facilities that discharge through 56 POTWs around the Bay. To date, the Agency has established pretreatment standards for 23 of 24 industrial categories, with the final standard now in the proposal stage. Moreover, out of the 56 POTWs required to have these pretreatment programs, 53 are now in place.

All point sources, including industrial dischargers not using POTWs, must have NPDES permits which state the types and levels of wastes that may be discharged. New toxic limits are being written into many of these permits for the first time as a result of the initiatives being taken on behalf of the Bay. For example, Maryland has specific toxic limitations on pollutants including ammonia, cyanide, chlorine and others for 67 of 83 major dischargers. Virginia has specific toxic limits for 46 of 53 major dischargers.

The control of nutrients in the Bay has been guided by the Upper Bay Phosphorus Limitations Policy of 1979 as well as carefully considered plans for rivers like the Potomac and the Patuxent. We are already aware of the benefits to Bay water quality as a result of reductions in phosphorous loadings from several major projects. Figure A, attached to my testimony, shows that while population has increased steadily since 1965, phosphorus discharges have dropped dramatically. We would anticipate further benefits when other projects reach completion. Most of the decrease in phosphorus has occurred since 1983 and can be traced to improvements to the Blue Plains and the Back River treatment facilities as well as the phosphate detergent ban in the state of Maryland and the District of Columbia.

While we are pleased with this progress regarding point source controls, the Bay Program is particularly proud of the progress being made to control nonpoint sources of pollution. Quite apart from their significance to the Bay cleanup effort these nonpoint source programs are serving as valuable pilot projects. Demonstration of their effectiveness in the Chesapeake Bay will be assessed for their application to other estuaries in the nation. These studies on nonpoint source controls will also provide us with better perspectives on our own needs for future control efforts.

The fiscal year 1986 Chesapeake Bay funds are now being transferred to the states for use this fall and winter. The majority of these funds will be for nonpoint source control programs. By the end of the second quarter of this year, the three Bay states will have installed BMPs on over 90,000 acres, reduced erosion on those acres by 330,000 tons and reduced phosphorus losses from the land by about 2 million pounds annually within the Bay basin. At the same time, wastes from over 20,000 animal units have been controlled, reducing phosphorus losses from the land by another 1.4 million pounds per year.

Our progress to date in the Bay is not limited simply to reducing pollution loads; we can also see greater efforts at enforcement. Taking enforcement actions against illegal discharges of pollutants -- both toxics and nutrients -- is an enormous task in which the states must play a major role. High priority must be given to the identification of serious and harmful pollutant discharges, as well as the often-recalcitrant polluters who cause them. Once identified, we can focus efforts on the development of agreed upon compliance schedules or judicially approved consent decrees to bring polluters into compliance.

One aspect of the enforcement effort which I believe deserves particular attention, Mr. Chairman, is what we call the National Municipal Policy. As part of this effort, we have identified those POTWs which will require upgrading to attain secondary or better treatment by July 1988. Of those facilities so identified, almost 60% of the POTWs in Maryland

and almost 90% of those in Virginia have either the compliance schedules or the consent decrees just mentioned.

Finally with respect to the enforcement effort, I am pleased to be able to report to you that federal facilities near the Bay are evidencing a serious commitment to the cleanup effort.

The Department of Defense, for example, maintains over 50 installations near the Chesapeake Bay, encompassing nearly 400,000 acres and employing over 250,000 people. During the past decade, DOD has spent almost $250 million for the completion of projects in the Bay region. Additionally, DOD currently has about 19 anti-pollution projects under construction as part of the Bay cleanup effort.

To assess the effectiveness of all of our control efforts the Chesapeake Bay Program introduced a 50-station monitoring network that now provides trend and water quality data at two-week intervals. These are data that the earlier phase of the Program did not have. We have maintained the Chesapeake Bay Computer Center in our Annapolis office to manage this monitoring data and to make it accessible to all interested participants. In response to the Executive Council's concern, and with the support of EPA's Office of Pesticides and Toxic Substances, we have recently expanded our monitoring program to examine in selected harbors in the Bay, concentrations and aquatic effects of the highly toxic tributyltins originating from hull bottom paint.

The results of these monitoring studies will be reported with our other initial findings in the State of the Bay Report scheduled for publication at the end of the year.

In addition to the Program's monitoring network, the Citizens Program for the Chesapeake Bay has initiated a monitoring program in both the Patuxent and James Rivers. This network is supported by volunteers who sample and analyze water quality weekly. Their efforts appear to be inspiring similar citizen sampling programs in several other areas of the Bay.

The Citizens Monitoring Program is but one aspect of the Bay Program's commitment to a strong citizen information and involvement program. We have a strong and committed Citizens Advisory Committee. Our work with the Citizens Program for the Chesapeake Bay includes funding for staff located with each of the major states, newsletters and a wide variety of workshops.

We are pleased to work with a Scientific and Technical Advisory Committee (STAC) that is now examining several aspects of water quality standards and treatment technology. Their recent report on Nutrient Control Technologies has spurred significant interest in a new approach to nitrogen removal from point sources. As Figure 4 shows, nitrogen discharges have grown in step with population increases since [illegible]. The STAC nutrient report suggests that the new approach to the removal of nitrogen may be both more effective and less costly than previously thought. We now believe that these controls, in conjunction with an increased emphasis on nitrogen reduction from nonpoint sources, may be a source of the next major improvements in the Bay's water quality.

Where We Go From Here.

Under the implementation phase of the Chesapeake Bay Program, we began by building on existing state and EPA programs. We used the findings and recommendations of the 1983 Chesapeake Bay report to guide us. To continue the progress seen in the control of phosphorus and toxics, we have begun a second phase of our planning effort. This next step will develop: numerical goals for water quality, goals for the Bay's living resources; loadings for the Bay and its tributaries; specific control efforts; cost estimates for meeting these goals; and estimates on the time it will take to achieve them. The Phase II results will guide future cleanup activities for the Bay. I will continue to give thess activities the highest priority, however, effective implementation of our plans will only be possible with the cooperation and support of the state members of the Executive Council.

Using what we learn through Phase II, I would like to see for instance the Executive Council forge a new Chesapeake Bay Agreement. One consideration might be to use the Great Lakes Water Quality Agreement of 1978 as a model for new efforts in the Chesapeake Bay. The Great Lakes Agreement has been in place for the last eight years and has served this nation and Canada well. Drawing upon that experience, a new Chesapeake Bay Agreement ought to focus on the following:

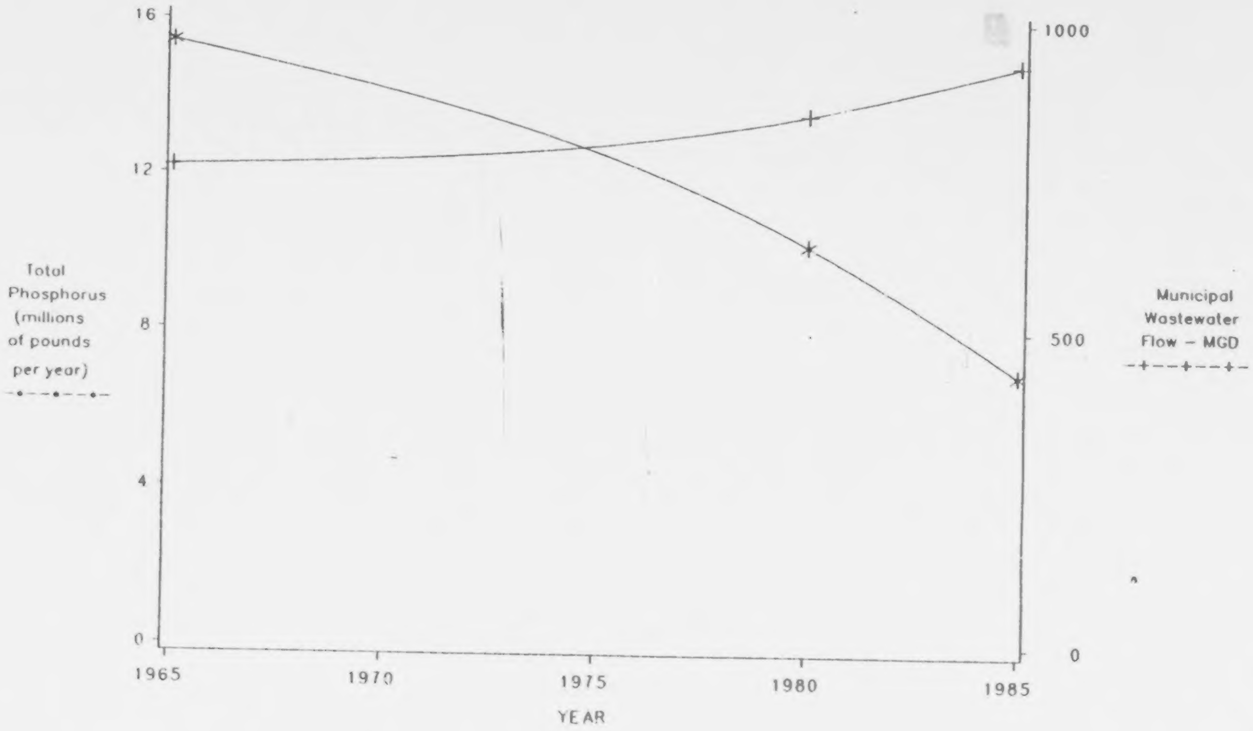
- Water quality and living resource goals for major tributaries and the Bay;
- Bay tributary load limits;
- Technologies and management measures to meet those load limits; and
- Establishment of schedules and assignment of responbility for implementing the program.

With this in mind, Mr. Chairman, let me just point out that it has taken years to pollute the Chesapeake Bay; it will take years to clean it up. We must not be discouraged; but we must persevere and we must make the tough decisions required of us today if we are to meet the needs of tomorrow.

I believe that the challenge to protect and restore the Chesapeake Bay has been faced by both the federal government and our partners -- the states and local governments. We can report progress made, and with commitment and persistence we will continue to achieve even more. The Bay is one of our Nation's greatest treasures. In the end, the caring and the cooperative spirit that began this restoration effort will mark its continuation and assure its future success. Indeed, it is the very success we're seeing in the Chesapeake Bay that prompted EPA to initiate a National Estuarine Program last year. Our experience with the Bay gives us confidence that environmental managers in other estuaries also can develop effective plans to respond to their own environmental problems.

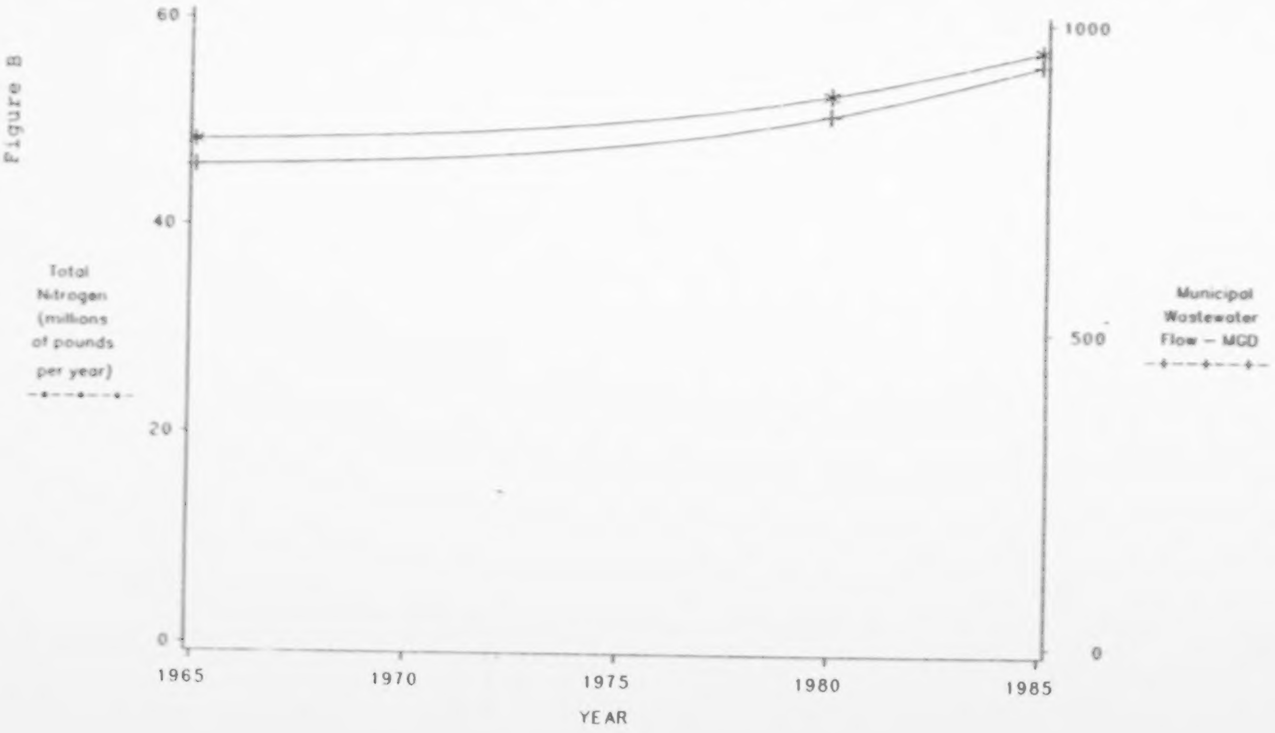
This concludes my prepared statement, Mr. Chairman. I will be happy to answer any questions you or the Subcommittee may have.

Figure A



Annual Phosphorus Discharges and Wastewater Flows Below the Fall Line and in the Lower Susquehanna From Municipal Sewage Treatment Plants

Figure B



Annual Nitrogen Discharges and Wastewater Flows Below the Fall Line
and in the Lower Susquehanna From Municipal Sewage Treatment Plants

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C. 20460

SEP 26 1986

THE ADMINISTRATOR

Honorable Charles McC. Mathias, Jr.
Chairman, Subcommittee on Government
Efficiency and the District of Columbia
United States Senate
387 Russell Senate Office Building
Washington, D. C. 20510

Dear Senator Mathias:

I am pleased to respond to the questions on the Chesapeake Bay Program raised by Members of the Subcommittee as indicated in your letter of July 21, 1986. Responses to those questions are provided for the Subcommittee's consideration and review.

Since the Subcommittee hearing, the Chesapeake Executive Council met on July 17, 1986. Of particular significance to the Subcommittee was the setting of a timetable by the Council for an Interim Report of Phase II Planning Activities. In addition, the Council agreed to closely review the direction of the Bay Program's pollution abatement efforts in light of the report's conclusions. I believe the Interim Report and its review will result in steps being taken to establish further actions and intergovernmental efforts that are crucial to the successful restoration of the Bay.

May I say again that the success of the Chesapeake Bay Program effort could not have been possible without your interest, commitment and leadership. It has been my pleasure to work with you and I can assure you that the EPA has made a commitment to continue our efforts.

Sincerely,

Lee M. Thomas

Enclosure

Letter was cc to the following:

Governor Gerald Baliles
Richmond, Virginia

Governor Richard L. Thornburg
Harrisburg, Pennsylvania

Governor Harry Hughes
Annapolis, Maryland

Mayor Marion Barry
Washington, D.C.

Regional Administrator Jim Seif
Philadelphia, Penn.

1. What specific actions are NOAA and EPA taking to ensure that, once water quality is improved, the fish will come back?

No one can assure that striped bass and other finfish species will return to the levels of the past. There is a high probability, however, that as we begin to improve the water quality and thereby restore the habitat quality, the remaining living resource species will have sufficient vitality to rebuild their stocks. The objectives setting living resources/habitat workshops proposed to be sponsored by the Living Resources Task Force (membership from Virginia, Maryland, NOAA, EPA, F&WS, STAC, CAC) are directed towards developing the link between water quality improvements and habitat restoration. The living resources and habitat criteria to be developed through this workshop process will more clearly define those water quality conditions required to support habitat restoration and therefore provide for the return of striped bass and other species.

2. Will it be possible to institute interim nitrogen goals in the Bay when the results of the 2D model are made available?

One purpose of the Chesapeake Bay Program's Phase II implementation strategy is to ensure that a Baywide nutrient strategy is developed in a comprehensive manner. Recognizing that much valuable information will be available prior to completion of Phase II, an Interim Report will be produced in June 1987. The Interim Report will provide a Baywide assessment of the nutrient issue based on the application of the 2D, steady state model of the Bay.

The Chesapeake Executive Council at its meeting on July 17, 1986, agreed that it would consider the interim report as the basis for possible adjustments to the nutrient control programs applied to the Bay. I believe that this action may set the stage for the establishment of pollution control goals and the intergovernmental agreements to reach them that I called for in my testimony.

3. If the 2 dimensional eutrophication model results indicate that nitrogen controls at the Blue Plains treatment plant are necessary, how will EPA deal with the expansion?

If the results of any current or planned studies (2D Baywide model, 3D Baywide model or Potomac River model) indicate that nitrogen controls are necessary at Blue Plains, then EPA will consider amending the NPDES permit for the Blue Plains facility to require nitrogen removal. The Blue Plains plant and its expansion are designed to allow for the addition of nitrogen control facilities if they are shown to be needed in the future.

Current construction grant regulations do not allow federal funding for future growth. However, EPA funds would be available (subject to D.C. approval) to provide funding for upgrading the Blue Plains STP for nitrogen removal for the existing flow. Any expansion beyond existing flow would be funded by local government agencies who would also be required to fund nitrogen removal facilities associated with the expansion using only their own funds.

4. Should we develop a Toxics Action Plan and "Toxics Geographical Area of Concern" list to properly deal with toxics problems in the Bay?

The CBLO recognizes the environmental threat posed by toxic substances and is developing a draft "Chesapeake Bay Toxic Pollutant Control Strategy." The strategy seeks to enforce requirements called for by existing environmental legislation and to encourage leadership in developing new approaches to control toxicity. In accordance with the strategy, the CBLO is working with other regional programs to provide the necessary technology and guidance to assist the states in developing toxic control procedures for point sources and in inventorying and prioritizing RCRA and Superfund sites for nonpoint source control.

5. If future scientific evidence showed that Bay waters could only be cleaned up by using mandatory BMPs, how would EPA respond to improve the Bay's water quality and living resources?

In some ways, mandatory BMPs are already part of some state programs. In Pennsylvania farmers must have and follow a nutrient management plan on their land before they can receive any cost share for other BMPs. Further, NPDES permits can be required for feedlot operations. Also, some urban and construction activities are to have mandatory controls installed and enforced through state and local regulations. The threat of regulation is sometimes enough to gain cooperation from the unregulated target groups.

Were a mandatory nonpoint source program needed, the first step would be to request that authority from either the participating states or Congress. Once given the authority, the implementation plan would need to be developed to guarantee the effectiveness of each BMP and combinations of BMPs.

The problem with any mandatory BMP program is going to be resources to implement it. Though it would be easy to require every farm to have a management plan and have it implemented by a certain date, finding the planners to do the job within the time required would be difficult. It would also take time and effort to ensure that the lands in question are polluting and need plans, and that the plans are correct. The next problem would be finding enough qualified contractors and inspectors to examine the construction and farming operations to ensure that the right BMPs are carried out correctly. These inspections would require several times the field staff presently employed through SCS, conservation districts, Extension Service and the jurisdictions.

6. (a) Should the 30-30-30-10 funding split formula be changed to instead be targeted to more specific areas of critical need. (b) Should the SCS target its 31 positions to specific areas of nonpoint source pollution problems?

(a) The Executive Council, not EPA, established the funding distribution. The Executive Council will examine this distribution to ensure that it is targeted to critical areas, and that states have the capacity to match the funds that are available. The grant money is now targeted to critical areas in each state. The selection of critical areas was done differently in each jurisdiction. All critical area designations should often be reviewed. Money can be justifiably split in many ways; close to a dozen concepts were proposed originally. One way might be to split money based on pollutant loads. This would put a greater portion of the funds into Pennsylvania, but the Commonwealth, under its current budget could not match those funds with its own nonpoint dollars. Modeling during Phase II will help better direct the funds by showing where the largest pollutant load reductions can be achieved with the best results.

(b) SCS has placed the 31 positions either in counties that have the greatest work load because of the Bay implementation efforts, or in support of those field people.

7. What land use strategies should be instituted to deal with the reality of population growth?

In addition to increasing municipal loadings, an expanding population displaces environmentally beneficial land uses. Projections show that most growth and land use change will occur near the Chesapeake Bay and its tributaries, the most environmentally sensitive areas.

Land use stategies must be developed in conjunction with both point source and nonpoint source control strategies in order to define reasonable and attainable goals for them. Local governments, which normally regulate land use, may require additional guidance in order to regulate it to benefit water quality.

8. What criterion is EPA and NOAA using to determine at which particular point the Bay clean up program is a success, especially as it relates to living resources?

The recently adopted Phase II planning program will define planning targets more specifically than they have been defined in the past. While computer models can be used to guide the selection control strategies by showing their probable effects on certain aspects of water quality, monitoring will be required to confirm that these projections were accurate, and to chart progress in areas, such as living resources, that cannot be modeled.

It is expected that this monitoring will reveal increments of success that will guide program refinements, including such decisions as changing emphasis and discontinuing certain activities.

We believe both continuing effort on fish species stock assessment and joint monitoring of juvenile life stages by the states and NOAA are needed to monitor the anticipated success. Continuing analytical effort needs to be directed towards establishing causative links between monitored variables and the living resource "end products."

9. What steps are being taken to see that Bay problems are given priority in assessing construction grant requests?

Construction grant regulations require the states to develop a priority system for ranking projects eligible for EPA funding. One of the main factors to be considered in this ranking procedure is the water quality impact. Both Maryland and Virginia's priority systems give higher rating points for water contact recreational use and shellfish protection. This assures that Bay projects are given high rankings for potential construction grant funds.

10. (a) How are the monitoring programs being related to the Bay's modeling program and improvements of the Bay's living resources? (b) How will the monitoring determine at which point the Bay clean up is a success?

(a) The Chesapeake Bay monitoring program was designed to provide the scientific means to measure the relative effectiveness of the pollution abatement programs now being implemented and to support the development of comprehensive water quality models. Now in its third year, the monitoring effort continues to provide data to calibrate the computer models being developed.

(b) The monitoring program has begun to produce analytical results which will be the baseline from which to measure progress toward achieving water quality conditions to support the restoration of habitat for living resources. Direct and indirect links between living resources monitoring and biological and water quality monitoring are being explored so that a more complete understanding can be gained of what water conditions promote and sustain populations of finfish, shellfish and submerged aquatic vegetation. The monitoring program will tell us where we have achieved our water quality objectives for specific tributaries of the Bay, outline those areas where living resources have diminished or grown in abundance, and will demonstrate whether the Bay ecosystem has responded to our clean up efforts in both the short and long term.

11. (a) What steps is EPA taking to encourage greater private sector participation in the Bay's restoration efforts? (b) What do you see as the most appropriate and effective role for the private sector?

(a) A list of potential private sector initiatives has been proposed in the Bay Program Communications Strategy. These include projects in the categories of education/information, research and community relations. In addition, there is representation on the Citizens Advisory Committee (CAC) from industry. Further, there is a task force of the CAC which is examining "creative" financing, including privatization, of wastewater treatment plants and other projects related to the Bay clean-up. One of the items which could be incorporated in the Citizens Program for the Chesapeake Bay grant is the sponsorship of workshops for and with the privzte sector.

Phase II of Bay Program implementation presents clear opportunities for involving the private sector. Therefore, through the Implementation Committee, ways to involve the private sector are being explored. During the Phase II process, particularly in the objectives setting, economic studies and studies of available technologies, industry assistance would be very helpful.

(b) The public sector fulfills valuable research/demonstration, communications and advisory roles.

12. Should the states of West Virginia, Delaware and New York be included in the clean-up program so that activities are coordinated throughout the entire drainage basin?

Ideally, the three states should be part of Chesapeake Bay Agreement and programs. In some ways, they are today. The Soil Conservation Service staff member assigned to the CBLO serves all six states, keeping the State Conservationists apprised of all Bay activities. Extension Service and ASCS also is working with the whole basin. EPA's activities which are not Bay Program-connected still are integrated with the Bay effort (permits, grants, Superfund, RCRA, etc.).

Development of basin-wide plans to control nutrients and toxicants from point and NPS were general recommendations of the Chesapeake Bay Program (CBP) to Maryland, Pennsylvania, Virginia and the District of Columbia, for areas proximate to the Bay with high potental for impact. Longterm strategies should seek to reduce or maintain loadings from subbasins that do not deliver as much pollution load to the Bay.

The present philosophy is to work with the Bay-bordering jurisdictions and Pennsylvania because those jurisdictions contribute the greatest pollutant loadings of nutrients, toxic substances and sediments to the Bay and its tributaries. Within those states critical areas have been targeted for agricultural nonpoint source control. When the sources closest to the Bay, the lower Susquehanna and Potomac are controlled, then the work may progress further up the Susquehanna, into New York, and further up the Potomac, eventually into West Virginia. The headwaters of the Nanticoke River drain to the Bay from Delaware, adding little pollution.

Staff from environmental agencies within New York, West Virginia, and Delaware have expressed different levels of interest in participating in the Chesapeake Bay cleanup but, this interest has not been expressed at the governors' level.

If the states of New York, Delaware and West Virginia were to participate in the Bay Agreement, they would wish to share in the implementation grants funds. This would detract from funds available for areas with direct impacts on the Bay and lessen the effectiveness of the clean-up.

13. How will Phase II address habitat criteria and incorporate them into the process?

A Living Resources Task Force was recently formed by the Implementation Committee. By December it is to provide draft criteria for inclusion in the Phase II process. Those criteria will be for species and habitat areas of the Bay and its tributaries. The criteria will be provided to the Committee and considered in developing the clean-up strategies which will be tested in the 2D Model runs. It will also be used to direct the emphasis of other on-going agency programs.

14. (a) What is being done to coordinate or target future research efforts, both private and governmental? (b) What are the most pressing research needs as far as the Bay is concerned?

(a) The Chesapeake Bay Program's Modeling and Research Subcommittee will be evaluating research needs. EPA has asked specific staff at the Liaison Office to organize the evaluation of research needs in light of the Restoration and Protection Plan, and is planning and will coordinate jointly with NOAA a Baywide research conference in the first half of 1987. That conference will be directed to focus on management (mission-oriented) needs. The Monitoring Subcommittee is also evaluating research linkages with their work, and regularly invites scientists to discuss with the Subcommittee the status of their work and how its results will augment the monitoring program.

The Modeling and Research Subcommittee has developed a Technical Activities Matrix which is stored and maintained in the Bay office data center. The matrix is an information management system available to Chesapeake Bay Program agencies. It contains summaries of current research activities of the four jurisdictions, the seven federal agencies and cooperating universities in the areas of nutrients, toxicants, land use and living resources management. Its goals are to provide a tool to enable managers to assess which research questions are not being adequately addressed; to provide an overview of activities in the four research areas; and to facilitate information transfer.

The Chesapeake Research Consortium (CRC), which provides secretariat support to the Scientific and Technical Advisory Committee (STAC) through a CBP cooperative agreement, and the STAC members also track the private sector research at universities.

The Maryland Power Plant Research Program has funded VIMS to update its computerized bibliography of Bay scientific and technical literature, in an attempt to catalog literature at its primary source: research institutions.

The Bay research which industry is pursuing is generally not reported to the Bay Program, though the Bay Program is aware, through personal contacts, of process and aquaculture research at major corporations.

NOAA, through Virginia and Maryland Sea Grants, is inventorying and documenting data bases of all historical and current Chesapeake Bay research to update the National Environmental Data Referral Service.

(b) There are several areas where gaps in knowledge are recognized:

- fate and transport of toxic contaminants
- nutrient and contaminant flux from and to the sediments
- linkages between water quality, habitat restoration and rebound of living resources (cause and effect relationships)
- refinement of present understanding of chemical and physical estuarine processes.

Chesapeake Bay Foundation
"Environmental Defense · Environmental Education · Land Preservation"
162 Prince George Street • "The Church" • Annapolis, Maryland 21401
301-268-8816 (Annapolis) 269-0481 (Balto.) 261-2350 (Wash., D.C.)

TESTIMONY OF WILLIAM C. BAKER

PRESIDENT, CHESAPEAKE BAY FOUNDATION

BEFORE THE SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY AND
THE DISTRICT OF COLUMBIA,
COMMITTEE ON GOVERNMENTAL AFFAIRS
UNITED STATES SENATE

JUNE 25, 1986

Richmond Office: 11 South 12th Street, Suite 314 • Richmond, Virginia 23219 • (804) 780-1392

INTRODUCTION

The Chesapeake Bay Foundation is a non-profit conservation organization dedicated to the protection of the Bay and its natural resources. With over 35,000 members representing every state in the Union, CBF has offices in Annapolis, Maryland and Richmond, Virginia and is opening a new office this summer in Harrisburg, Pennsylvania. We appreciate this opportunity to appear before the Senate Subcommittee on Governmental Efficiency and the District of Columbia to share our views on the present and future role of the Chesapeake Bay Program.

The Chesapeake Bay Program has fostered an atmosphere of intergovernmental cooperation that has been extremely valuable to the Bay restoration effort. Thanks to the vision of Senator Mathias, and the leadership of the governors whose states form the drainage basin to the Chesapeake, tangible progress has been made toward implementing programs that may lead to the eventual restoration of our estuary. Improvements are underway at municipal wastewater treatment plants to reduce the levels of phosphorus entering the Bay. Project grants to the states as part of the Bay program have, among other things, encouraged farmers to reduce the runoff of pollutants from their fields. Most importantly, through the Chesapeake Bay Program we have come to understand that the factors contributing to the Bay's decline do not recognize state boundaries, but can be addressed only by a coordinated, regional solution.

The importance of the EPA Chesapeake Bay Program for the success of our efforts to date cannot be overstated. The Bay clean up effort is just beginning, however. A forum for future cooperation between state and federal governments will be essential to the resolution of the problems that still face us. Only through a long-term commitment can we hope for success. This dictates the continuation of funding for the Chesapeake Bay Program beyond the current authorization for fiscal year 1988. The magnitude of the task before us suggests a higher level of federal financial assistance for the program in future years. CBF believes that the Chesapeake's importance as a national resource mandates a strong and continuing federal role in its restoration.

In addition to supporting continued funding for the Chesapeake Bay Program, we have summarized in the pages that follow a set of recommendations for continued progress in the clean up. The recommendations focus primarily on the issues of nutrient management and the reduction of toxic discharges because we believe these are critical to a broad area of restoration efforts. Some of our suggestions call for the continuation of existing initiatives begun over the past several years. Others suggest new avenues.

II. PHASE II IMPLENTATION

A. NUTRIENT MANAGEMENT

The 1983 EPA Chesapeake Bay Program Study linked increased levels of two nutrients, phosphorus and nitrogen, to deteriorating water quality in the Bay and its tributaries. The introduction of these nutrients in excessive amounts can adversely affect the health of an estuary in several ways. Algal growth may be stimulated, resulting in "blooms" that reduce light penetration in the water column. This in turn limits the growth of submerged aquatic vegetation, the "bay grasses" that serve a number of important ecological functions in our estuary. More importantly, excessive algal growth depletes the water's oxygen supply through the decay process. The problem of anoxia in the Bay during summer months is well documented. Due to the linkage between nutrient overenrichment and declining water quality, federal and state initiatives aimed at restoring the Bay have focused on strategies to reduce phosphorus and nitrogen inputs.

Phosphorus and nitrogen enter the Bay from a variety of sources, both point and non-point. Important point source contributors include sewage treatment plant and industrial outfalls. Farm runoff and urban/suburban stormwater are the principal non-point sources of nutrients. Nutrient control strategies on the Bay have to date aimed at reducing non-point source loadings of both phosphorus and nitrogen. In addition, point source phosphorus loadings are being reduced as a consequence of the Upper Bay Phosphorus Policy. A comparable policy aimed at reducing nitrogen inputs from point sources does not currently exist.

Recommendation:

AN EFFECTIVE CHESAPEAKE BAY NUTRIENT REDUCTION POLICY MUST INCLUDE A STRATEGY FOR POINT SOURCE NITROGEN CONTROL

The 1983 EPA Chesapeake Bay Program Study recognized nitrogen availability to be a controlling factor for summertime phytoplankton populations in much of the Chesapeake. In testimony before this committee on March 1, 1984, we made an identical recommendation for nitrogen control. Now more recent studies further underline the importance of nitrogen availability to algal productivity. They are summarized in a statement issued this January by the Chesapeake Bay Program's Scientific and Technical Advisory Committee. There is a growing consensus in the scientific community that in much of the Bay, a nutrient control stategy must include nitrogen control.

Despite this growing awareness of nitrogen's role, EPA continues to discourage point source nitrogen removal, three full years after completion of the 1983 report. With the exception of several publicly owned treatment works on Maryland's two Patuxent projects and three pilot projects in Virginia, there are no current plans to reduce nitrogen inputs from Bay sewage treatment plants. In fact, nitrogen loadings from sewage treatment plants into the Chesapeake will increase substantially during the next decade as a consequence of projected population growth.

CBF believes that point source nitrogen reductions are essential to continued progress in the Bay clean up. Although groundwater inflow and sewage treatment plant discharges are prime sources of nitrogen available to phytoplankton during the growing season, the control of groundwater inflow can be accomplished only through long term changes in agricultural practices. The only way to achieve short term impacts is by reducing nitrogen inputs from sewage treatment plants.

It is of course true that significant costs may be associated with conventional point source nitrogen removal, and a program for reducing nitrogen from all of these sources will also be a long term project. Biological nutrient removal technology may be far more cost effective, however. The Bay states and EPA should immediately establish an interim strategy to begin to reduce nitrogen inputs to the most highly enriched tributaries.

Recommendation:

THE ESTABLISHMENT OF AN INTERIM NUTRIENT REDUCTION STRATEGY SHOULD BE AN IMMEDIATE PRIORITY FOR THE STATE AND FEDERAL BAY RESTORATION PROGRAM

CBF believes that the establishment of a basin by basin nutrient reduction strategy is essential to continued progress in the Bay's restoration. The development of this strategy should be a primary and immediate goal of Phase II implementation. The strategy should assure the protection of water quality in the tributaries as well as the reduction of nutrient loadings to the main stem.

The EPA Chesapeake Bay Program is in the process of completing a two dimensional water quality model that will be used to estimate necessary nutrient reduction goals for Bay tributaries. Recognizing the potential utility of such water quality modeling, we support the EPA's efforts. We are convinced, however, that the development of an interim nutrient reduction plan can and should begin, even before the completion of EPA's model. CBF proposes the following approach:

1. Tributaries to the Chesapeake should be classified in accordance with their degree of nutrient enrichment. We suggest that there be three such classifications: highly enriched, moderately enriched, and non-enriched. The information necessary to permit this classification is already available. Figure 1, prepared by the EPA Chesapeake Bay Program, illustrates the degree of nutrient enrichment in the principal Bay tributaries.

2. Principle point sources of nutrients should be identified for each tributary. Figure 2, prepared by the Chesapeake Bay Program's Scientific and Technical Advisory Committee, illustrates total phosphorus and nitrogen discharged by major municipal point sources in Maryland and Virginia. Similar data is available for the Susquehanna drainage basin in Pennsylvania.

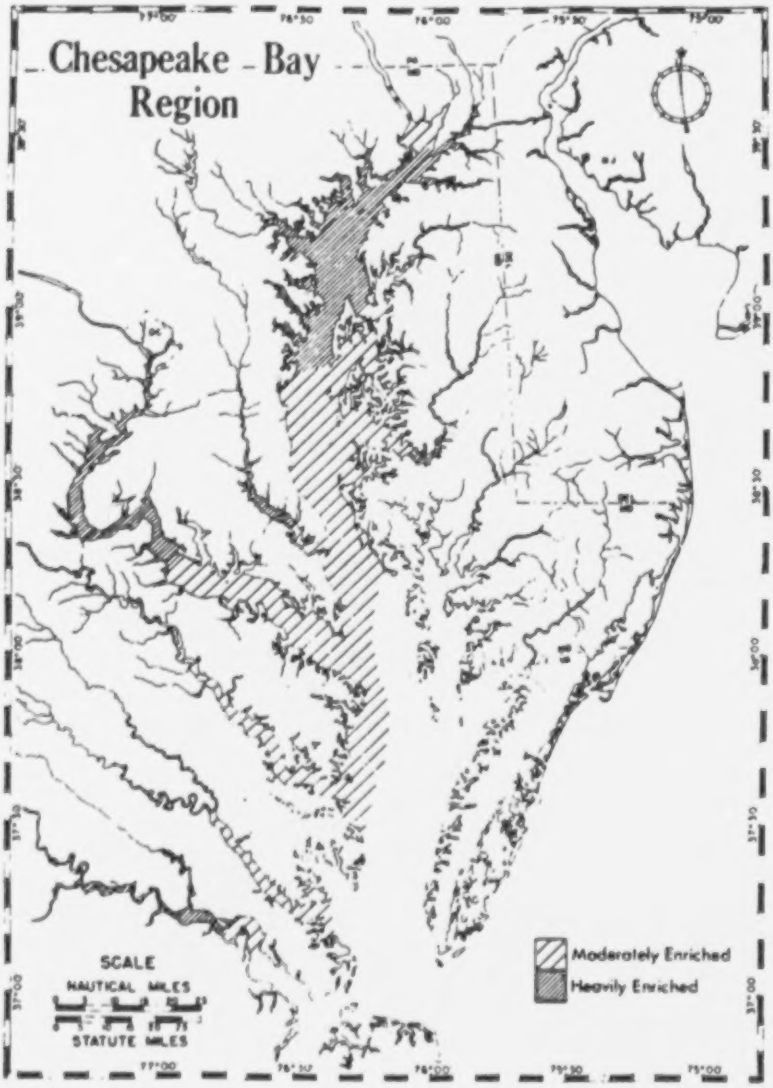

Chesapeake Bay Region
77°00
76°30
76°00
75°30
75°00
39°30
39°00
38°30
38°00
37°30
37°00
Moderately Enriched
Heavily Enriched
SCALE
NAUTICAL MILES
STATUTE MILES

Figure 1: Map showing portions of Chesapeake Bay that are moderately or heavily enriched according to the criteria of Heinle et al. (1980).

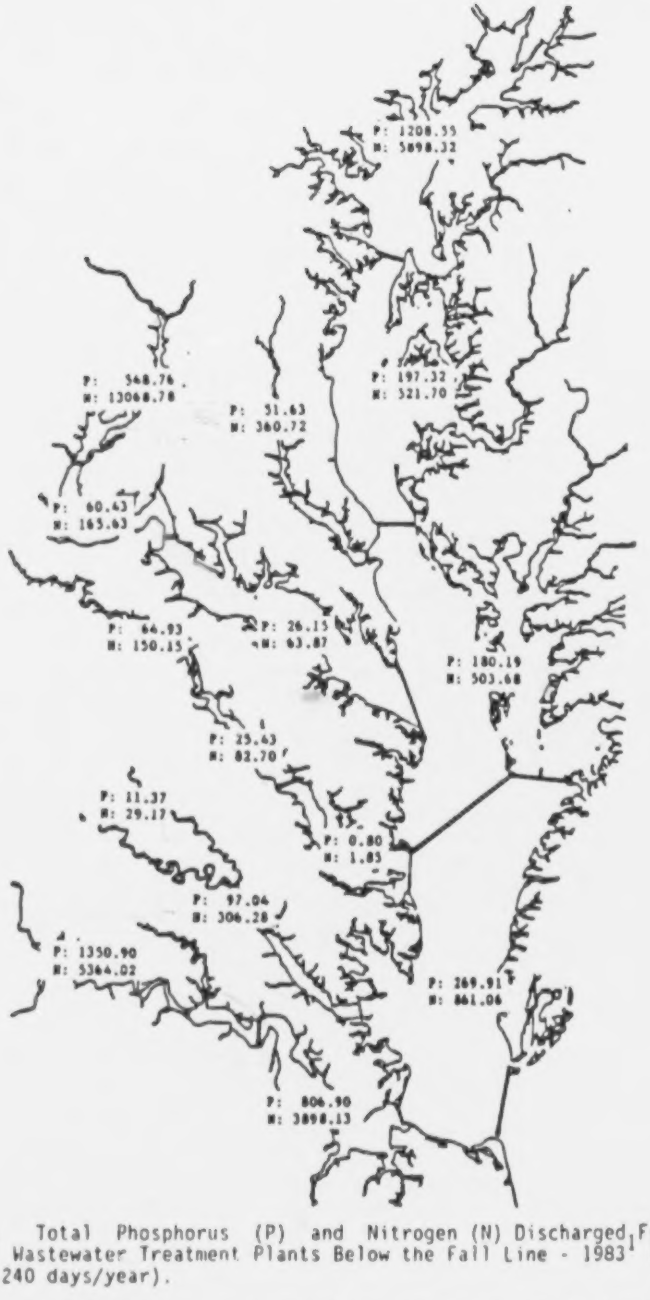

P: 1208.55
N: 5898.32
P: 548.76
N: 13068.78
P: 51.63
N: 360.72
P: 197.32
N: 321.70
P: 60.63
N: 165.63
P: 64.93
N: 150.15
P: 26.15
N: 63.87
P: 180.19
N: 503.68
P: 25.63
N: 82.70
P: 11.37
N: 29.17
P: 0.80
N: 1.85
P: 97.04
N: 306.28
P: 1350.90
N: 5364.02
P: 269.91
N: 861.06
P: 806.90
N: 3898.13

Figure 2: Total Phosphorus (P) and Nitrogen (N) Discharged From Major Municipal Wastewater Treatment Plants Below the Fall Line - 1983[1] (1000 lbs nutrient, 240 days/year).

[1] Combination of estimates and actual measurements of discharges. Data obtained from EPA Chesapeake Bay Program.

3. In tributaries classified as highly enriched, the interim strategy should call for phosphorus and nitrogen removal at all municipal point sources discharging in excess of ten million gallons per day of wastewater. The level of required treatment would reflect the degree of removal achievable through the use of biological nutrient removal technology. The discharge limits required of individual point sources would thus be "technology-based" under the interim strategy, rather than tailored to precise water quality needs. In tributaries classified as moderately enriched, the strategy should impose similar point source nutrient removal requirements, unless it could be demonstrated that the contribution from a particular point source was insignificant when compared with other sources on that tributary. In those tributaries classified as non-enriched, no specific point source nutrient reductions would be called for under the interim strategy.

On its face, this approach may appear overly simplistic. It should be noted, however, that a similar technology-driven strategy was chosen by Congress to address point source pollution in the Clean Water Act. When it passed the Act in 1972, Congress recognized that progress in reducing the degradation of our nation's waters could not wait for the development of limitations based upon scientifically precise water quality models. Moreover, the Upper Bay Phosphorus Policy, that is significantly reducing point source phosphorus loadings to the northern Bay, is essentially a technology-based stategy. The existence of a limited degree of scientific uncertainty should not deter us from planning now to address a clear and present problem.

This interim strategy is, of course, only a first step. A more finely tuned approach must be developed as we acquire more knowledge about the dynamics of nutrient cycling in our waters. Because CBF believes that a clear need exists to reduce both phosphorus and nitrogen inputs from point sources now, we think the establishment of our interim, technology-based strategy for nutrient removal should be a priority.

Recommendation:

THE CHESAPEAKE BAY PROGRAM SHOULD ACTIVELY SUPPORT BANS ON THE USE AND SALE OF PHOSPHORUS CONTAINING DETERGENTS TO BE IMPLEMENTED IN ALL BAY WATERSHED STATES

Laundry detergents are an important source of phosphorus compounds entering sewage treatment plants and, ultimately, our waters. As much as one third of the phosphorus entering publicly owned treatment plants is attributable to phosphate detergents. At sewage treatment plants that currently remove phosphorus, treatment costs are significantly higher as a consequence of detergent-phosphorus in plant influent. Bans on the sale of these detergents are an effective and cost efficient way to achieve immediate reductions in phosphorus loadings to our waters and reduce the cost of sewage treatment. However, in spite of the fact that the 1983 study called for nutrient reduction, EPA has never advised the states to consider phosphate bans or supported their adoption.

Recognizing the merits of a phosphate ban, Maryland passed legislation in 1985 prohibiting the sale of laundry detergents containing phosphorus. The District of Columbia followed suit. In Virginia, a legislative committee is currently studying the need for such a ban. CBF believes that the EPA Bay Program should actively encourage Virginia and Pennsylvania to adopt similar legislation.

Recommendation:

THE REDUCTION OF NON-POINT SOURCE NUTRIENT LOADINGS SHOULD CONTINUE TO BE A FOCUS OF THE BAY RESTORATION EFFORT

Surface runoff and groundwater inflow from agricultural and urban/suburban areas are a major source of nutrients entering the Bay watershed. The EPA Chesapeake Bay Program Study has estimated that during a normal year, 39% of the phosphorus and 67% of the nitrogen entering the Chesapeake originate from these non-point sources. In general, non-point sources of pollution have not traditionally received the same level of recognition or funding as have point sources. Recognizing the need to better address this problem, the Bay states adopted a number of legislative and budgetary initiatives in 1984. These initiatives have included state cost sharing to encourage the installation of best management practices in agricultural and developed areas, the adoption of stormwater management and sediment and erosion control legislation and regulations, and the funding of additional personnel to address non-point issues. In addition, Maryland has adopted a comprehensive set of land use criteria for its shoreline areas that will act as a framework for reducing non-point source pollution. These initiatives have been made possible, in part, by project grants through the EPA Chesapeake Bay Program. Rather than assess the progress made under each of these initiatives, (such review of the status of non-point source initiatives in the Bay region was released in 1985 by the Chesapeake Bay Commission), we make the following recommendations.

Recommendation:

ADDITIONAL COST SHARE FUNDING AIMED AT ENCOURAGING AGRICULTURAL BEST MANAGEMENT PRACTICES IS NEEDED.

In all three Bay states, requests for best management practice cost sharing by interested farmers exceed the level of funding currently available. In Virginia, for example, requests for cost share grants in fiscal years 1984-85 outstripped available funding by over 2.5 to 1. In Maryland, funding short-falls have been exascerbated by uncertainty over the implications of federal tax reform for state general obligation bonds upon which the cost share program relies. CBF recognizes that the implementation of necessary, widespread changes in agricultural practice will be a long term process. We are appreciative of the substantial nonpoint source funding initiatives that have already been adopted in the Bay region. We are convinced, however, that expedient progress depends on the commitment of greater funding levels to meet the demand for cost share assistance and to assure the presence of adequate manpower for program implementation.

Recommendation:

THE EXECUTIVE COUNCIL SHOULD CONSIDER THE POTENTIAL BENEFITS OF COMPREHENSIVE LAND USE PLANNING IN REDUCING NON-POINT SOURCE POLLUTION.

The EPA Chesapeake Bay Program Study clearly established the link between our activities on land and the quality of our waters. We now know that roughly one half of the nutrients entering the Bay come from nonpoint source runoff. The way in which we manage future growth in our watershed thus has important implications for the Bay restoration effort.

Recognizing the need to minimize the impacts of man's activities in our sensitive shoreline areas, Maryland recently adopted criteria to guide the development of lands within 1,000 feet of the Bay and its tidal tributaries. Known as the "Critical Area Criteria," these regulations will help channel future growth in the shoreline counties into those areas that can best accommodate it. The Critical Area Criteria prove that it is possible to protect our coastal zone without adversely affecting economic growth. EPA did not advise on or support Maryland's Critical Area legislation, even though the 1983 study found that land use practices adversely affected the Bay. Nor has the EPA Bay Program actively encouraged similar programs in Virginia, Pennsylvania or the District of Columbia, even though EPA staff publicly recognize the importance of the program and according to Mr. Thomas B. DeMoss, Director of Marine and Estuarine Protection, are "talking it up around the country," [The Baltimore Sun, May 11, 1986].

CBF believes that now is an opportune time for the other Bay states to consider comprehensive land-use programs. We urge the EPA Bay Program and Executive Council to support the adoption of creative growth management initiatives throughout the Bay watershed.

B. REDUCING TOXIC DISCHARGES TO THE BAY

The presence of excessive levels of toxic substances was one of three critical Bay water quality problems identified by the EPA Chesapeake Bay Program. Two general classes of toxic substances were studied; inorganic materials such as the metals-- cadmium, chromium, copper and zinc,-- and organic compounds including pesticides, polynuclear aromatic hydrocarbons (PNA's) and chlorinated hydrocarbon compounds (PCB's, etc.). The highest concentrations of both types of pollutants were found in the Patapsco and James River basins. In parts of the Bay, present levels of toxic substances threaten healthly aquatic organisms.

Recommendation:

EFFECTIVE ADMINISTRATION OF THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM IS ESSENTIAL TO THE REDUCTION OF TOXIC DISCHARGES

The imposition of technology-based limits in individual discharge permits pursuant to the federal Clean Water Act has significantly reduced point source discharges of toxics to Bay waters. These reductions are attributable to the incorporation of EPA's industrial effluent guidelines into reissued National Pollutant Discharge Elimination System (NPDES) permits. Assuring discharger compliance with these new, more stringent permits should be a priority for the Executive Council, EPA Region III and the Bay states.

Too often in the past, discharge permits have been little more than a paper exercise. As a consequence CBF and other environmental groups have been forced to file citizen suits to assure compliance. We are encouraged by recent improvements in permit monitoring and enforcement in Maryland and, to a lesser extent in other Bay states. We believe that the success of any toxics strategy depends on effective implementation, and this requires rigorous, even-handed enforcement.

Recommendation:

WATER QUALITY STANDARDS FOR PRIORITY TOXICS SHOULD BE ESTABLISHED DURING PHASE II IMPLEMENTATION

An important goal of Phase II implementation is the establishment of environmental requirements necessary for the restoration of the Bay's living resources. CBF believes that the development of numerical water quality standards for toxics necessary to support a balanced, indigenous community of aquatic life should be a part of this initiative.

As mentioned above, the imposition of technology-based limits in Clean Water Act discharge permits has significantly reduced inputs of toxics to Bay waters. In part of the watershed, however, more stringent limitations are needed to protect water quality and living resources.

The Clean Water Act requires that the states periodically review water quality standards they have established for toxic substances. Unfortunately, this requirement has never been a priority for either EPA or the Bay states. Maryland, for example, does not have water quality standards for those commonly present toxics identified in the 1983 EPA Chesapeake Bay Program Study. As a consequence, necessary steps to protect aquatic life from excessive levels of toxics have not been taken.

As part of Phase II implementation, the Executive Council should establish a timetable for the development of estuarine water quality standards for toxics posing the greatest threat to Bay aquatic life. Because such standards would be applicable to estuaries throughout the nation, EPA should take the lead in providing the technical resources necessary for their development. Standards for toxic metals should be established prior to the next triennial review in each state. Once such standards are established, waste load reductions necessary to achieve these standards can be developed.

Recommendation:

THE COMPLETION OF EFFECTIVE PRETREATMENT PROGRAMS IN THE BAY STATES SHOULD BE A GOAL OF PHASE II IMPLEMENTATION

As discussed above, more stringent NPDES permits have reduced toxic loadings from industries discharging directly to our waters.

Many industries discharge their wastewaters into publicly owned treatment works (POTWs), however, and are not regulated by the NPDES program. Historically, these "indirect" dischargers have not been required to significantly reduce toxics in their waste streams. As a consequence excessive levels of toxics have entered our sewage treatment plants, interfering with treatment processes, contaminating sludge, and passing through the treatment system into our waters.

Recognizing the problem posed by such indirect dischargers, Congress required the establishment and imposition of pretreatment standards for industrial dischargers to publicly owned treatment works. The standards were intended to assure that unsafe levels of toxics did not enter our sewage treatment plants. Until recently, however, Congress' pretreatment mandate was not being effectively implemented in the Bay states. As a result, the Chesapeake Bay Program Study characterized effluent from several Bay sewage treatment plants as moderately to highly toxic. CBF is aware of several cases in which inadequate pretreatment has materially impaired the treatment capability of publicly owned treatment works. By diminishing POTW treatment capability, poor pretreatment undercuts the substantial public investment in capital improvements to sewage treatment plants while posing an unnecessary threat to water qualtiy.

In the past several years the Bay states have made progress in addressing this problem. Much work remains, however. A significant number of publicly owned treatment works still lack approved pretreatment plans. Pretreatment limits are still, in many cases, inadequate to protect water quality and sewage treatment plant operation. As part of Phase II implementation, CBF recommends that the Executive Council make the establishment of more effective pretreatment programs a priority.

C. THE CHESAPEAKE BAY RESTORATION PROGRAMS: FUNDING FOR CONTINUED PROGRESS

Recommendation:

STATE FINANCIAL PLANS SHOULD BE ADOPTED TO ASSURE ADEQUATE FUTURE FUNDING OF BAY RESTORATION MEASURES

Progress in restoring Bay water quality depends in part on the provision of adequate funding for capital improvements to sewage treatment plants and programs aimed at reducing nonpoint source pollution. The passage of the Gramm-Rudman-Hollins deficit reduction bill and the application of "new federalism" policies threaten substantial reductions in the availability of federal funding for the clean up effort. As a consequence, major state and local funding initiatives for the Bay restoration will be necessary.

Perhaps the greatest threat to continued progress in Bay restoration is posed by anticipated cutbacks in the Clean Water Act's Construction Grants Program. This program currently provides fifty-five percent matching grants for improvements to publicly owned treatment works. The appropriation level for this program was $2.4 billion this fiscal year. The Construction Grants Program has been primarily responsible for nationwide improvement in the quality of sewage treatment plant effluent. In currently pending Clean Water Act reauthorization legislation, Congress has proposed terminating this program by 1994. The administration is pushing for an earlier demise to the program, with an end to all funding in 1989. CBF believes that the Administration's proposal would undermine progress in reducing point source discharges of pollutants to the Bay. The enormity of anticipated sewage treatment construction needs in the Bay region is summarized in the following table based upon the 1984 EPA needs survey.

SEWAGE TREATMENT CONSTRUCTION NEEDS

THROUGH YEAR 2000
(in millions of dollars)

	PA	MD	VA	DC	Total
Secondary Treatment	1,307	272	604	97.5	$ 2,280.5
Advanced Treatment	295	595	66	171.3	$ 1,127.3
Total	1,602	867	668	268.8	$ 3,407.8

These figures do not include the cost of retrofitting existing plants to remove nitrogen, nor do they reflect costs associated with the correction of combined sewer overflows. Obviously, a major cutback in federal assistance would act as an impediment to these needed improvements. Maintenance of satisfactory funding for the construction grants program is critical to the success of ongoing programs to improve water quality. At a minimum, the transition period embodied in the House Clean Water Act reauthorization bill is called for. The House bill would provide $21 billion for construction grants and to help establish state revolving funds through 1994.

The Chesapeake Bay truly is a resource of national importance. Its clean up program should be a model for other estuaries throughout the country. CBF believes that the federal government has an obligation to assist the Bay states in meeting this clear financial need.

Simultaneously, it is essential that state funding for the Bay clean up be given a higher priority. The Chesapeake Bay Foundation appreciates the state funding initiatives adopted during the past several years and we commend Governors Hughes, Thornburg, Robb, and Baliles. But we are only beginning. An objective examination of future restoration needs dictates a greater commitment of state financial resources.

The establishment of state revolving funds and creative financial instruments will be needed to meet this challenge. Opportunities for greater private sector participation in the clean up effort will have to be re-examined.

Recommendation:

CBF RECOMMENDS THAT THE EXECUTIVE COUNCIL IMPOSE A TIMETABLE FOR THE DEVELOPMENT OF STATE BAY RESTORATION FINANCIAL PLANS

State plans for the Bay restoration effort should aim at assuring the provision of adequate funding for needed clean up measures, including point source nutrient removal where indicated, by the year 2000. The Executive Council should further assure that a forum exists for the discussion of funding alternatives, and should actively work to eliminate any roadblocks to adequate funding.

III. ADMINISTRATION OF CHESAPEAKE BAY PROGRAM

Recommendation:

REPRESENTATION ON THE EXECUTIVE COUNCIL AND IMPLEMENTATION COMMITTEE SHOULD BE EXPANDED

On March 1, 1983, in testimony before this subcommittee, CBF recommended the establishment of a Chesapeake Bay Liaison Office to carry on the EPA Bay Program and promote continued cooperation among the states. That office has been created and remains in operation today. To a large extent, we believe it has played an important role and urge its continued funding.

A second recommendation called for the creation of a "Board of Directors" or blue ribbon panel to advise the on-going EPA Bay Program. Its makeup, we testified, should include appropriate governmental officials, environmentalists, scientists, and we would add now, members of the business community. Unfortunately this recommendation has not been followed.

Rather, an "Executive Council" and an "Implementation Committee" of state and federal representatives were created to fulfill the management and advisory need. The private sector had no representation. Eventually, after much prodding, two satellite committees were formed - the Citizens Advisory Committee (CAC) and the Scientific and Technical Advisory Committee (STAC). Although the existence of these bodies is a step in the right direction, they are not an adequate substitute for representation on the Executive Council or Implementation Committee. We urge this situation be rectified through designation of non-governmental representatives to sit on both of these bodies.

Recommendation:

METHODS TO IMPROVE COORDINATION AND COMMUNICATION BETWEEN THE EXECUTIVE COUNCIL, THE IMPLEMENTATION COMMITTEE, AND ADVISORY SUB-COMMITTEES SHOULD BE CONSIDERED

At the present time coordination and communication between the Executive Council and Implementation Committee and its Advisory Sub-Committees leaves much to be desired. We urge an evaluation of the present situation to determine how it can be rectified. CBF strongly believes that improved input from the Advisory Sub-Committees will result in better informed decision making by the Council and the Committees.

Additionally, the present structure and operation should be reviewed with the goal of providing consistent direction to the program which is insulated, to the extent possible, from changes in personnel and political administrations, both at the state and federal level. The initiation of long-range work plans might be one measure to be considered.

IV. CHESAPEAKE BAY FOUNDATION'S FUTURE ROLE

The role of the Chesapeake Bay Foundation will continue to be one of independent watchdog. Funded by private contributions, CBF is able to monitor, evaluate, and advise the EPA Bay Program on the best practical management of the Bay.

Furthermore, CBF will continue to take initiative itself. Our law suits against Bethlehem Steel, American Recovery, and Gwaltney of Smithfield for continuous and unnecessary violations of the Clean Water Act in 1984 highlighted the problem of poor enforcement of existing laws at the state and federal levels. In addition, CBF has publicized the poor compliance record of sewage treatment plants and worked to strengthen the permits. In one case, a law suit was filed against the Commonwealth of Virginia and the City of Richmond for failure to comply with federal law in the planned upgrade of the 70 million gallon per day Richmond sewage treatment plant. That suit has been settled out-of-court.

In coming years, we will place an ever greater emphasis on improved land use policies by the states. Our Critical Area Advocacy Project will help insure that the Maryland Critical Area Program is implemented at the local level and enforced at the state level. We will be supporting and helping to shape similar policies in Virginia and Pennsylvania for improved land management.

Finally, CBF will put additional resources to work on another form of nonpoint source pollution - agricultural runoff. Our model farm in Upper Marlboro will be further upgraded and will serve as a basis for an expanded farmer outreach program while continuing to educate thousands of young people annually. We will also hire an agricultural economist to work full-time at the local, state, and federal levels on agricultural policy issues. The Chesapeake Bay Foundation will also, of course, continue its programs of environmental education for students of all ages and its program of land conservation. The education work uses the Bay as a classroom and laboratory to teach estuarine ecology and biology to over 25,000 students annually. The lands program works to preserve important Bay lands for future generations. We feel that both of these programs are superb long-term investments in the future of the Chesapeake Bay.

V. Conclusion

EPA's Chesapeake Bay Program is the primary governmental entity that addresses the Bay as a single system. It can make recommendations for management and administration that transcend state boundaries, and thus serves a vital function in the overall clean up effort. While we commend the Program for its work to date, we believe that adoption of the recommendations set forth above will strenghten and enhance the Bay restoration effort.

Thank you.

Chesapeake Bay Foundation

"Environmental Defense · Environmental Education · Land Preservation"

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Joseph H. Maroon
Virginia Executive Director

August 20, 1986

The Honorable Charles McC. Mathias
U.S. Senate
Senate Office Building
Room 387
Washington, D.C. 20510

Dear Senator Mathias,

The Chesapeake Bay Foundation greatly appreciates your leadership in organizing the June 24 hearing on the future direction of the Chesapeake Bay restoration effort. Our responses to your follow up questions are set forth below. Please let us know if we can be of any further assistance.

1.) "The possibility exists that the Blue Plains sewage treatment plant will have to expand by 20% to accommodate growth in Montgomery County, causing an increased nitrogen output to the Potomac River. We don't have the results of the Bay-wide 2-Dimensional nutrient model to determine the impact of the increased nitrogen output on the Bay. If the 2-D model shows nitrogent controls to be necessary for the plant, how should we deal with this situation."

Preliminarily, CBF does not advocate waiting for the completion of EPA's 2-Dimensional nutrient model before establishing interim nitrogen and phosphorus reduction goals for tributaries to the Bay. We believe that a sound basis exists now for point source nitrogen reductions on the Potomac. Nitrogen's role as the limiting nutrient in much of the Bay is summarized in a recent report prepared by the EPA Chesapeake Bay Program. A copy of this succinct report is attached for your review. We ask that it be made a part of the hearing record.

In our testimony we suggested that sewage treatment plants discharging in excess of ten million gallons per day on enriched tributaries be required to remove nitrogen. We further sugested that nitrogen discharge limits for these plants be based upon the

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level of treatment achievable through the use of biological nutrient removal technology. Preliminary information indicates that biological nitrogen removal is the most cost effective solution for many sewage treatment plants. We believe that this treatment option should be considered now at Blue Plains sewage treatment plant.

2.) **"Many people have indicated that 'selected tributaries' should be designated for implementing specific strategies, such as nitrogen control, to obtain direct scientific measurements of the benefits to the living resources. Would you comment on this suggestion?"**

CBF believes that our nutient control strategy for the Bay should be based up on the scientific information currently available. We do not agree with delaying the decision to implement nitrogen removal on the Bay until measurable water quality improvements are demonstrated in Maryland's Patuxent River. We believe that existing data justify the establishment of a nitrogen control strategy now. Given the inevitable substantial lag time between the adoption of such a strategy and its implementation, we believe that reliance on a "selected tributaries" approach would delay, unjustifiably, the restoration of our estuary.

3.) **"To improve the water quality of the Bay, the 1983 EPA Bay study indicated that nitrogen and phosphorus inputs to the Bay will have to be curbed. Should EPA revise its Advanced Treatment Policy to allow for the upgrading of sewage treatment plants to remove nitrogen?"**

CBF strongly supports the revision of EPA's Advanced Treatment Policy to include the provision of funding for nitrogen removal at Bay sewage treatment plants. EPA's current policy does not conform with recommendations made in the previously referenced report issued by the agency's Chesapeake Bay Program (attached).

4.) **"Do you see a need for specific water qualtiy standards and loading goals for the Bay for toxic pollutants? Should EPA develop toxic water quality criteria for estuaries that could help address the problems on the Bay?"**

In our testimony of June 24 we recommended the establishment of water quality standards for a number of toxic pollutants present in Bay waters. We believe that section 303 of the Clean Water Act mandates the periodic revision and improvement of state water quality standards. CBF believes that the adoption of water quality standards for toxics, and their implementation, is essential to the fulfillment of Congress' will as expressed in the Clean Water Act, and to the restoration of the Chesapeake. EPA's leadership and technical expertise are essential to the success of this endeavor.

5.) "In the Great Lakes there is a screening program to detect toxic compounds and then deal with them. Shouldn't we develop a Toxics Actions Plan and 'Toxics Geographical Areas of Concern' to properly deal with the toxics problem in the Bay?"

Our recommendations for a Bay toxics control strategy are contained in our response to the previous question and in our answer to Question 7.

6.) "A recent Washington Post article raised questions about the NPDES permit system for activities in the Bay. Should there be changes in the NPDES permitting system and enforcement policies for activities that pollute the Bay."

As Victoria Churchville's recent article in the Washington Post points out, there is considerable room for improvement in the enforcement of the Clean Water Act's National Pollutant Discharge Elimination System. This problem is by no means confined to the Chesapeake Bay area. Dissatisfaction with the record of compliance has led conservation organizations throughout the country, including CBF, to challenge violators under the Clean Water Act's citizen suit provisions. Responsibility for this inadequacy belongs collectively to EPA, the states, and non-compliant dischargers.

The basic framework of the NPDES program, as set forth in the Clean Water Act, is adequate. But rigorous effective enforcement is necessary to translate the Act's goals into reality.

Industries that violate their permits enjoy an economic advantage over responsible, law abiding competitors. EPA's civil penalty policy seeks to eliminate any such economic advantage through the imposition of commensurate fines. Unfortunately this penalty policy is seldom applied. CBF believes a more widespread application of this policy would serve as an evenhanded determent to non-compliance.

We are particularly disturbed with the rate of non-compliance among publicly owned sewage treatment plants. CBF thinks it is important that the public sector act as a model in the Bay restoration effort. If this is to be the case, a solution to the current problem of non-compliance at municipal plants is a must.

7.) "Is there anything we can do to tighten NPDES discharge limits on nutrients and toxics, prior to establishing new criteria and standards in a few years?"

In our testimony, and again in answer to previous questions above, CBF called for the immediate implementation of an interim nutrient reduction strategy for enriched Bay tributaries. We stick by this recommendation.

Regarding toxic discharges, only the adoption and implementation of water quality standards will assure the protection of aquatic life. In the meantime, EPA and the states should, consistent with Section 301 of the Clean Water Act, ensure that all discharging industries are employing the best available technology for the removal of toxics from wastewater. In addition, the more expeditious implementation of the Act's pretreatment program is in order. Finally, the application of EPA's recently promulgated regulations on stormwater discharges should be a priority.

8.) "There has been considerable controversy surrounding the taking of striped bass. Do you see the need for a coastwide moratorium on the taking of striped bass?"

Since 1984 it has been our position that a coastwide moratorium is the simplest and most evenhanded way to assure the restoration of the eastern seaboard's striped bass population. In the event, however, that such a moratorium is not adopted, we continue to support the manditory application of the Atlantic States Marine Fisheries Commission's interstate management plan for striped bass, as contained in the Atlantic Striped Bass Conservation Act pending before Congress. We support the two-year reauthorization of that Act called for in the Senate bill.

Thank you for giving us the opportunity to comment on these important issues.

Sincerely,

William C. Baker
President

WCB:tak

NITROGEN, PHOSPHORUS, AND NUTRIENT MANAGEMENT IN THE CHESAPEAKE BAY: A REVIEW OF THE EVIDENCE FOR THE LIMITING NUTRIENT

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TECHNICAL SYMBOLS

DO - disolved oxygen
L - liters
mg - milligrams
N - nitrogen
NH_x - ammonia or ammonium ion
NO_x - nitrate or nitrite
ORP - oxidation reduction potential
POTW - publicly owned treatment works
P - phosphorus
TN - total nitrogen
TP - total phosphorus
uM - micro molar

EXECUTIVE SUMMARY

- A nutrient management strategy based on the limiting nutrient must have the technological capacity for efficient and cost effective limitation of the limiting nutrient and have a spacially and temporally consistent target nutrient. Recent work has improved our perspective of nutrient management issues.

- Five lines of investigation exist for examining Bay nutrient limitation: nutrient input loads, direct measurement of nutrient stocks, bioassay techniques, model analysis, and basin comparisons. This report concentrates on the first two analyses.

- Examination of nutrient input loads supports the observation that nitrogen has the potential for nutrient limitation in summer. Phosphorus may limit maximum biomass in the fall and spring.

- Historical monitoring data suffered from a paucity of information on nutrient stocks. Recent monitoring evidence indicates that the upper Bay is usually potentially phosphorus limited. The lower Bay is usually potentially nitrogen limited. Midbay regions south of the Chesapeake Bay Bridge are typically nitrogen limited in the summer.

- Basin differences in nutrient loads and sources are presented as well as load projections. Progress made in reducing phosphorus in waste water flows has not been matched by progress in nitrogen reduction.

- With the exception of the tidal fresh portions, the Bay does not have a singular nutrient that is spacially or temporally consistent. A nutrient management strategy must take into account basin differences in nutrient stocks, input loads, and future trends.

INTRODUCTION

The traditional view of nutrient management is based on the concept of the limiting nutrient. The limiting nutrient, that substance required for biological metabolism that is in the least supply, places the maximum limit on biomass. Nutrients primarily affect the standing stock by their impact on planktonic primary productivity. A management strategy successfully based on the limiting nutrient must have:

- enough anthropogenic control for efficient and cost effective limitation or removal of the target nutrient.
- a spacially and temporally consistent target nutrient.

Only recently have Chesapeake Bay nutrient processes been described, although with some uncertainties and caveats. Inputs and sinks have been quantified, and tentative nutrient budgets have been proposed (D'Elia et al., 1982). Water quality models in development should improve nonpoint estimates and further elucidate other inputs (Watershed, 2-D Steady State, and 3-D water quality models - Chesapeake Bay Program). Major benthic nutrient processes remain to be well quantified, but estimates have been made of their potential (Twilley and Kemp, 1985; Seitzinger, 1986). This paper will resummarize what is known of nutrient processes and nutrient limitation in the Chesapeake Bay and will examine the reliability of the information. The question of water quality improvements due to biological control of phosphorus and nitrogen at point sources will also be addressed.

Review of Bay Nutrient Processes

Bay nutrient loading is highly influenced by seasonal processes. In winter, light and temperature, not nutrients, limit the standing crop. The spring freshet delivers a large nitrogen load to the Bay almost entirely in the form of NO_X. The nitrogen load varies greatly between a wet or dry season. An average nitrogen load estimate for spring nonpoint loads is 69-71 million pounds; about twice the load of other seasons. As the season progresses, light and temperature increase BOD in both the sediment and water column (Officer et al, 1984; Tuttle et al, 1985). Complete oxygen depletion below the pycnocline in some areas of the Bay bottom reduces the oxidation-reduction potential (ORP). Denitrification further reduces the sediment ORP allowing phosphate desorption from previously precipitated or sorbed phosphate compounds. The summer sediment phosphate load may be as high as 7×10^6 pounds. Low sediment ORP also allows the increased release of interstitial phosphate by removing the surface barrier of oxidized phosphate. In contrast to benthic phosphorus, sediment ammonium nitrogen is released throughout the year. In the fall, reduced light and temperature decreases the oxygen demand. Bottom waters are reoxygenated and sediment ORP increases, removing phosphate rapidly from the water column. In general, two nutrient peaks: spring freshet nitrogen, and summer benthic phosphorus, are superimposed on more consistent point, atmospheric, groundwater, and base flow sources.

These nutrient inputs and outputs, the nutrient budget, can be seen in Figures I and II (modified from Chesapeake Bay Program Technical Studies - A Synthesis). The ultimate nitrogen sinks are sedimentation and denitrification. The ultimate phosphorus sink is sedimentation. The small estimated oceanic exchange of nutrients is an important characteristic of the Chesapeake. Almost all of the nutrient loads remain in the Bay, either in nutrient cycles or in permanent sediment burial. Sediment sinks act as a reservoir for a portion of the nutrients. Annually about 10 percent of the nitrogen and 23 percent of the phosphorus deposited in the sediments are cycled back to the water column. Values for sedimentation, denitrification, and oceanic processses have the greatest uncertainty but are reasonable working estimates (Jim Smullen, personal communication, 4/25/86). Although a nutrient budget tells us nothing specific of nutrient limitation, it is a useful overview of the various nutrient processes.

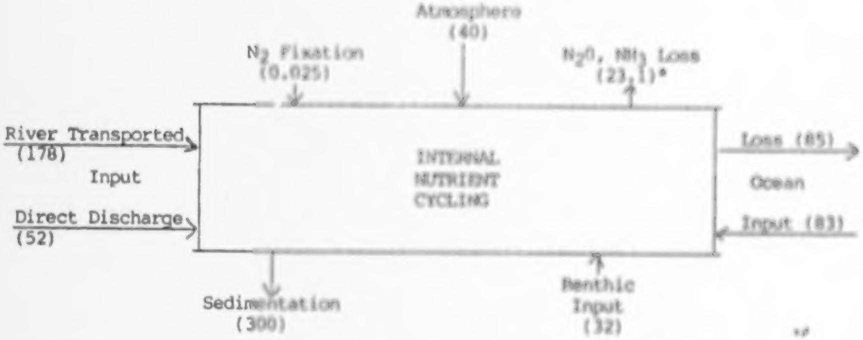
The limiting nutrient ultimately has its effect at the intracellular enzyme level. An indirect measurement to approximate this effect is the so-called Redfield ratio of N/P (Redfield, 1934), variously reported as 15/1 to 16/1 (by atoms). Significant deviation from this ratio of available nutrients indicates a potentially nutrient limited system. Ryther and Dunstan (1971) report that "normal" nitrogen to phosphorus ratios may vary from 3/1 to over 30/1, depending on species and nutrient availability. This report will follow the convention of 15/1 (by atoms) as a working value for the optimum ratio. Greater than 20/1 will be considered to be potentially phosphorus limiting. Less than 10/1 will be considered to be potentially nitrogen limited.

Photosynthetic plankton have preferential nutrient uptake of NH_3 nitrogen and phosphate phosphorus. For this reason, the chemical species of the nutrient must be considered. If enough of the preferred nutrient is available, little of other available species will be utilized by phytoplankton. However, biological and chemical conversion to other forms is always possible. Bioassay analysis of nutrient limitation in the Patuxent River has shown little preference between NH_3 and NO_3 (d'Elia et al.,1986). This report will summarize loads as total phosphorus and total nitrogen.

EVIDENCE FOR THE LIMITING NUTRIENT

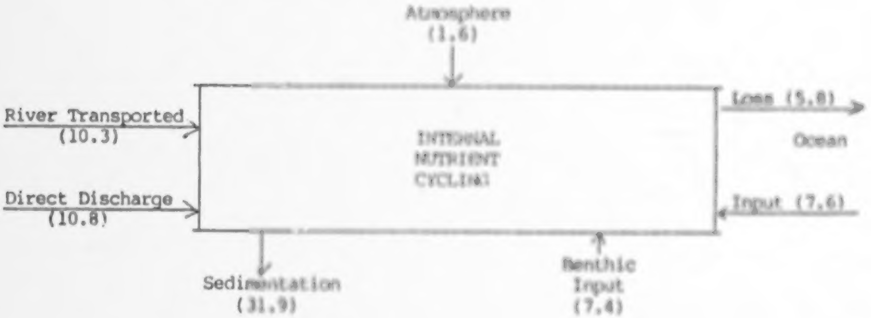
Five lines of investigation exist for examining Chesapeake nutrient limitation. One stoichiometric method is to quantify the input loads from major sources. To employ this procedure, one must assume that the Bay acts as a nutrient filter, trapping nutrients in biological or sediment cycles. This method is valid for a wide lens view of seasonal nutrient trends. Another stoichiometric method is measurement of nutrient levels in the water column (Biggs et al., 1983). More direct assessment of the limiting nutrient is possible with bioassay techniques (D'Elia, 1986). Modeling analysis is expected to provide quantitative evaluations of specific management options. Finally, comparision of the phosphate controlled Potomac basin and the dual nutrient controlled Patuxent basin is an ongoing effort which will add to our understanding of Bay nutrient management strategies. Application of bioassay techniques, modeling, and basin comparisons has until now, been limited. This report will concentrate on the stoichiometric analyses of the limited nutrient.

FIGURE I. ANNUAL NITROGEN BUDGET FOR THE CHESAPEAKE BAY
(Millions of Pounds)


Atmosphere
(40)
N_2 Fixation
(0.025)
N_2O, NH_3 Loss
(23.1)*
River Transported
(178)
Input
Direct Discharge
(52)
INTERNAL
NUTRIENT
CYCLING
Loss (85)
Ocean
Input (83)
Sedimentation
(300)
Benthic
Input
(32)

*Modified with Twilley's estimates of denitrification (Twilley, 1985).

FIGURE II. ANNUAL PHOSPHORUS BUDGET FOR THE CHESAPEAKE BAY
(Millions of Pounds)


Atmosphere
(1.6)
River Transported
(10.3)
Direct Discharge
(10.8)
INTERNAL
NUTRIENT
CYCLING
Loss (5.8)
Ocean
Input (7.6)
Sedimentation
(31.9)
Benthic
Input
(7.4)

Direct Discharge = point source loads discharging into Bay tidal waters
River Transported = point source and nonpoint source loads above fall line

Sediment and oceanic processes have the most uncertainty. Nutrient resident time and reservoir size need to be better quantified. The small oceanic flux indicates that nutrients put into the Bay tend to stay there. Nitrogen sinks are sedimentation, denitrification, and ocean loss. The phosphorus sink is sedimentation.

Input Nutrient Load Evidence

Examination of input nutrient loads provides a seasonal perspective of potential nutrient limitation. Table I shows the annual and seasonal loads from:

- atmospheric - primarily as nitrogen and phosphorus falling onto tidal Chesapeake Bay waters in precipitation.
- fluvial - includes loading from nonpoint sources, point sources, and groundwater from above the fall line.
- point sources - POTW's and industrial sources discharging into tidal waters.
- benthic - flux of nutrients between sediments and the water column.

The large spring increase of fluvial nitrogen is almost entirely from nonpoint sources (Point sources tend to change little between seasons). Spring and winter have the largest nitrogen loads. Summer benthic phosphate release is double that of other seasons. This is reflected in the load N/P ratios. Note that these N/P ratios are for nutrient loads, not what is actually measured in the water column. Care must be used in this analysis. The table shows seasonal trends but does not show basin differences, actual nutrient levels, nutrient species, or location in the water column. Nutrient loadings support observations that phosphorus may limit the maximum biomass in the fall and spring. Nitrogen has the potential for nutrient limitation in the summer. Again, the greatest uncertainty is benthic processes which dominate the phosphorus loading in the summer.

Historical Monitoring Evidence

Historical monitoring data required to calculate N/P ratios have been sparse due to a lack of phosphorus and nitrogen levels measured at a single station. One study (Biggs et al., 1983) of historical nutrient standing stocks by Chesapeake Bay segment (CB segment) found that nitrogen may be limiting in the summer in some basins, particularly the lower Patuxent (Figure IIIA and B). This study indicated that phosphorus was limiting in most CB segments in the summer and appeared appeared to be almost universally limiting in the spring and fall. The study suffered from the paucity of data that were available for the years 1970 to 1980. Accordingly, samples from this ten year period were lumped into 3 month groups: March, April, May; June, July, August; and September, October, November (not shown). Sample size for each segment rarely exceeded 10. Although combining data may have been necessary due to limitations of small data sets, the technique had a strong tendency to level the data and important information was masked. Other work in the lower Patuxent estuary (D'Elia et al., 1986) indicates that the strongest nitrogen limiting months are August and September. October is P limited. Obviously, the seasonal groupings used in the 1983 study would obscure this information. Additionally, most of the lower Bay was not included in the study due to incomplete nutrient information.

TABLE I. ANNUAL AND SEASONAL NUTRIENT LOADS TO THE CHESAPEAKE BAY
Average year rainfall. Compiled from sources in Chesapeake Bay Program Technical Studies: A Synthesis, 1982.

TIME FRAME	NUTRIENT	NUTRIENT SOURCES % of total (millions of pounds)				TOTAL	N/P†
		Atmospheric	Fluvial*	Point source	Benthic**	lbsx10^6	(atoms)
ANNUAL	total nitrogen	13% (40.4)	59% (178)	17% (52.1)	11% (32.2)	302.8	22.1
	total phosphorus	5% (1.64)	34% (10.3)	36% (10.8)	25% (7.44)	30.2	
SPRING	total nitrogen	15% (16.2)	67% (72.2)	12% (13.1)	6% (6.93)	108.4	31.9
	total phosphorus	7% (0.51)	57% (4.29)	36% (2.72)	0 ------	7.52	
SUMMER	total nitrogen	21% (12.2)	42% (25.1)	22% (13.1)	15% (9.05)	59.5	10.8
	total phosphorus	5% (0.60)	12% (1.42)	22% (2.72)	61% (7.44)	12.2	
FALL	total nitrogen	11% (5.91)	51% (27.9)	24% (13.0)	15% (8.30)	55.1	27.2
	total phosphorus	7% (0.30)	33% (1.49)	60% (2.70)	0 ------	4.49	
WINTER	total nitrogen	8% (6.16)	66% (51.4)	16% (12.8)	10% (7.93)	78.3	29.7
	total phosphorus	4% (0.21)	51% (2.97)	46% (2.67)	0 ------	5.83	

* Fluvial includes point source loads from above the fall line. Point source loads here are considered to be those that discharge directly into the Bay. Annually, point sources above the fall line contribute 7.68 million pounds of phosphorus and 26.7 million pounds of nitrogen.

** Not adjusted for denitrification. Recent work (Twilley et al, 1985) indicates that the potential for this sink may be as large as 0.15 million pounds/day. This sink may not operate in summer anoxic waters as coupled denitrification requires the aerobic oxydation of NH_3.

† These values are for atoms N / atoms P.

Recent Monitoring Evidence

Recent Bay monitoring activities allow a more complete analysis of N/P ratios. This ratio is formed from dissolved inorganic nitrogen (DIN) and dissolved inorganic phosphorus (DIP). The parameters for DIN are nitrite + nitrate + ammonia concentrations and the parameter for DIP is orthophosphorus. The monitoring program measures all of these parameters directly. All stations, cruises, and depths are combined in this analysis by month and CB segment. All mainbay and some tributary segments were included. For brevity, nutrient concentrations in umole/L and % frequency by month of phosphorus or nitrogen limitation is presented for three CB segments.

Two trends are obvious from the 1984, 1985 mainstem data. The north to south transition from fresh to saline water is associated with a shift from potentially phosphorus to potentially nitrogen limited waters (Figures IV, V, and VI). Chesapeake Bay segments CB-1 and CB-2 are always potentially phosphorus limited. Chesapeake Bay segments in the lower Bay; CB-7, CB-8, WE-4, and LE-5 are usually nitrogen limited. Segments CB-3, CB-4 CB-5, and CB-6 are transitional. These transitional portions show the greatest seasonal variation in nutrient stocks. Nitrogen is most frequently limiting in the summer in the mainstem south of CB-3. In the summer, nitrogen is almost always below the concentration typically considered to be critical for growth. Despite the large variation in nutrient concentration, the two seasonal nutrient peaks of spring freshet nitrogen and summer benthic phosphorus can be seen in the graphs of DIP and DIN in CB-3 and CB-5 (Figures IV and V). The driving force of the seasonal N/P trend is the summer phosphorus release from anoxic sediments.

The Evidence Combined

Combining the existing lines of analysis, the evidence is very good that much of the Bay is nitrogen limited in the summer and early fall. Phosphorus is potentially limiting (except for local effects of nutrient loading) in tidal fresh portions of the Bay, and Bay wide in late fall, and spring. Light and temperature limit biological production in the winter. Considering that this estuary acts as a nutrient filter and that a substantial portion of the nutrient loads are recycled, targeting the nutrient that is limiting at the time of greatest biological productivity has no obvious benefits.

Basin Differences and Nutrient Load Projections

The eight main basins in the Chesapeake are quite different in their nutrient loads and sources (Figure VII). Four basins: West Chesapeake, James, Patuxent, and Potomac are dominated by point source loads. Of these the Patuxent and the Potomac are municipal point source dominated, particularly during the summer low flow conditions. It appears likely that nutrient control of municipal point sources would result in water quality improvements in these basins. Basins with substantial industrial and municipal point source loads may also have water quality improvements.

FIGURE IV. NUTRIENT CONCENTRATIONS (IN μ-MOLES ATOMS) AND FREQUENCY OF POTENTIAL NUTRIENT LIMITATION IN CHESAPEAKE BAY SEGMENT CB-3.

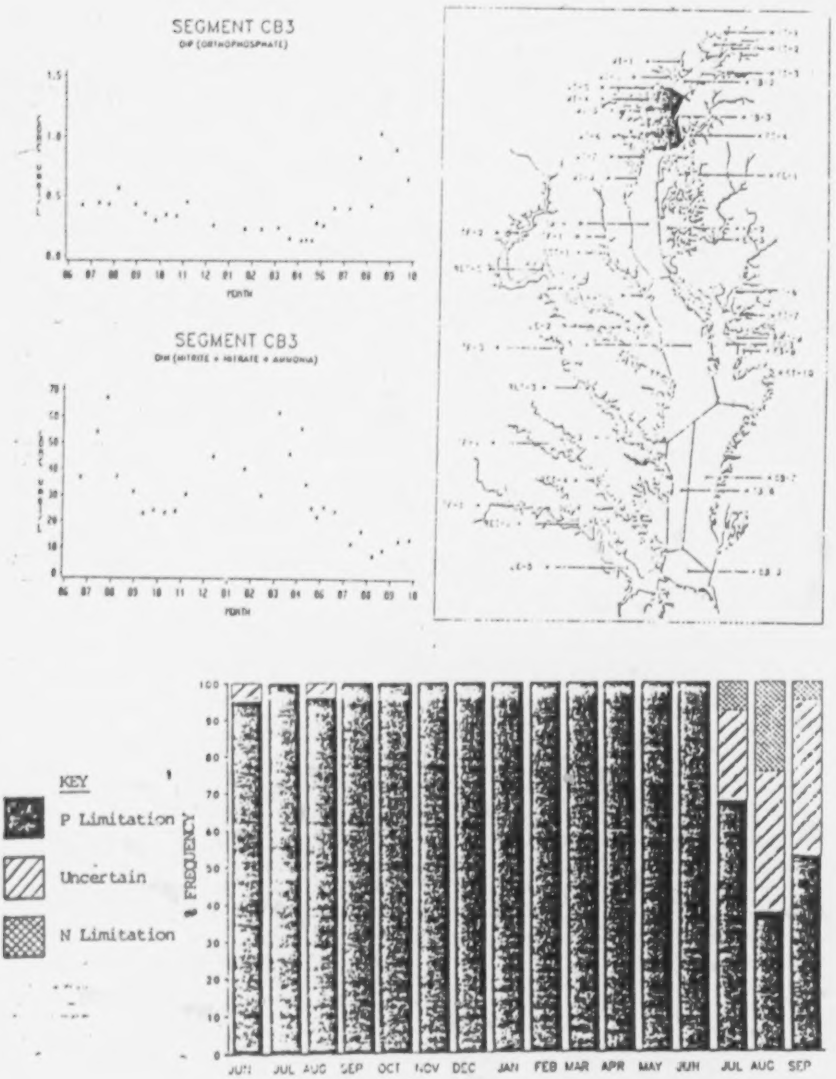


FIGURE V. NUTRIENT CONCENTRATIONS (IN μMOLES ATOMS) AND FREQUENCY OF POTENTIAL NUTRIENT LIMITATION IN CHESAPEAKE BAY SEGMENT CB-5.

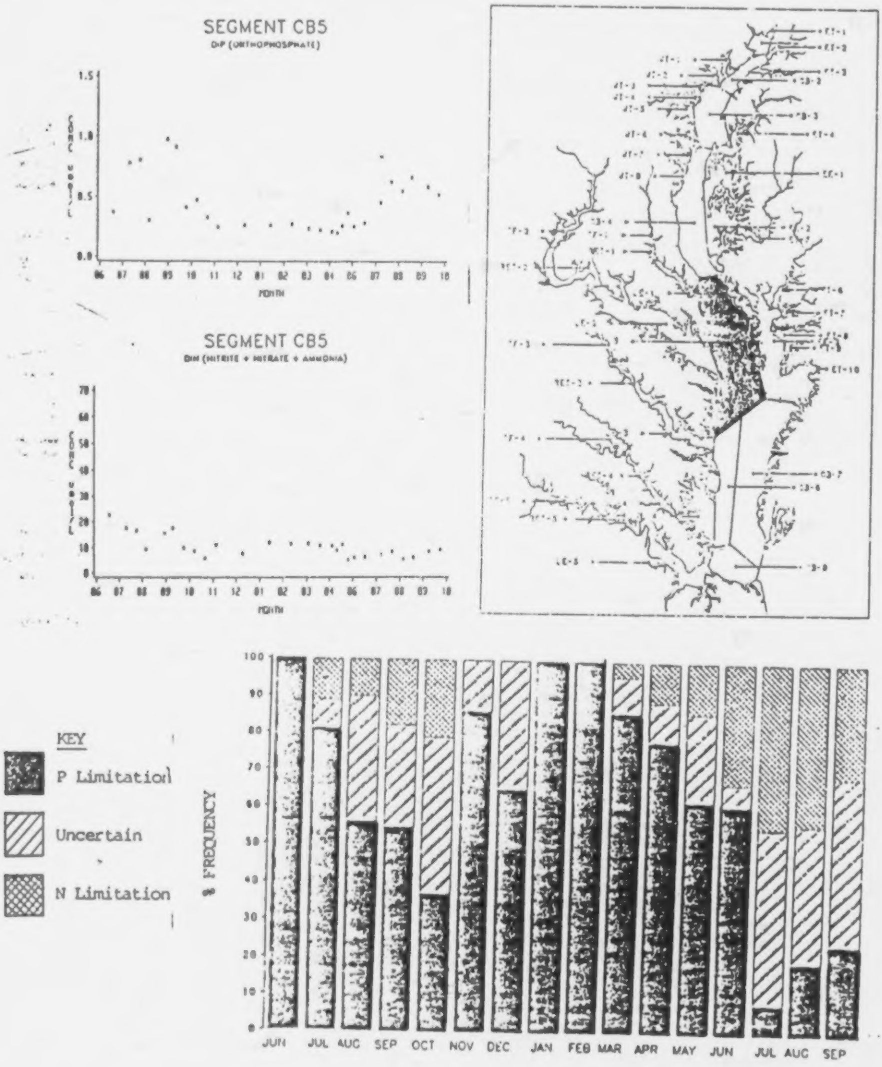
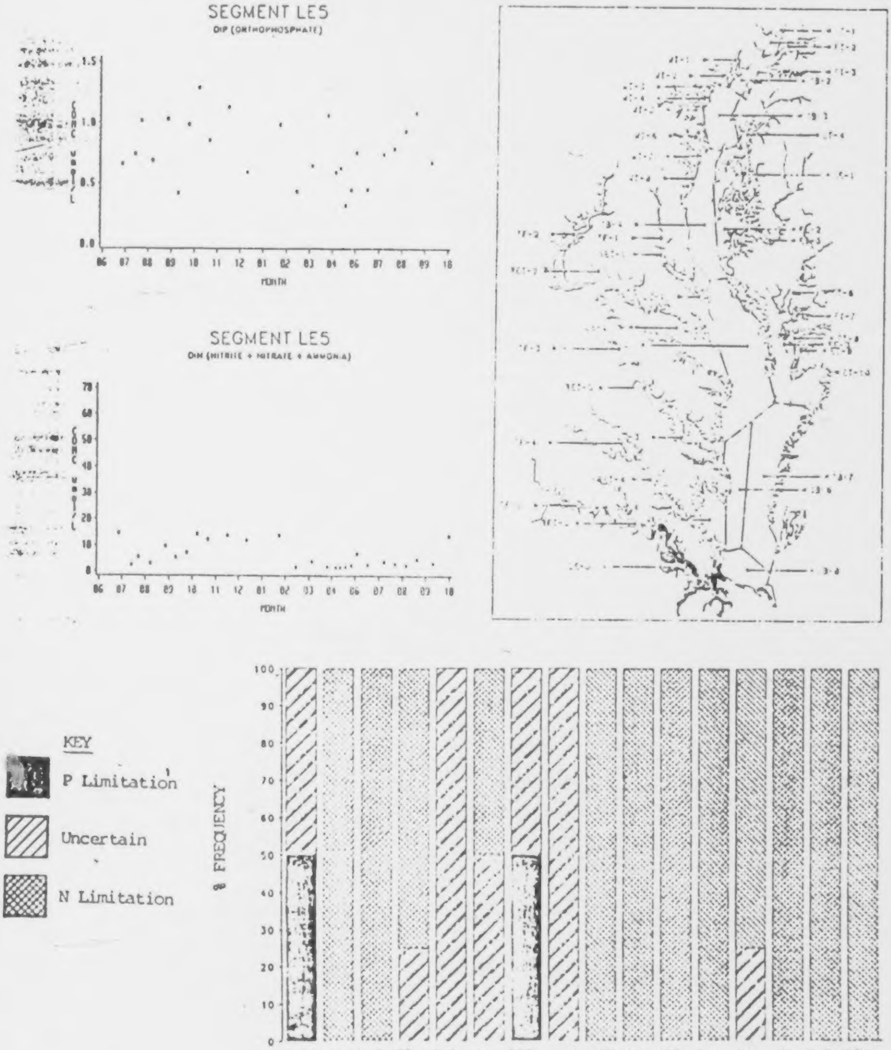


FIGURE VI. NUTRIENT CONCENTRATIONS (IN μ-MOLES ATOMS) AND FREQUENCY OF POTENTIAL NUTRIENT LIMITATION IN CHESAPEAKE BAY SEGMENT LE-5



Progress has been made in reducing phosphorus loads from waste water flows. This progress in phosphorus reduction has not been matched by any reduction in nitrogen loads (Figures VIII and IX) Year 2000 projections of municipal point sources are increases of 35% in flow, and 36% in nitrogen (Framework for Action, 1983). This load will be concentrated primarily in the urbanized basins of West Chesapeake, Patuxent, Potomac, and James. Nonpoint sources are expected to increase by only 3% for phosphorus and 1.3% for nitrogen. Load trends should be an important consideration in the assessment of water quality benefits from point source controls.

CONCLUSION

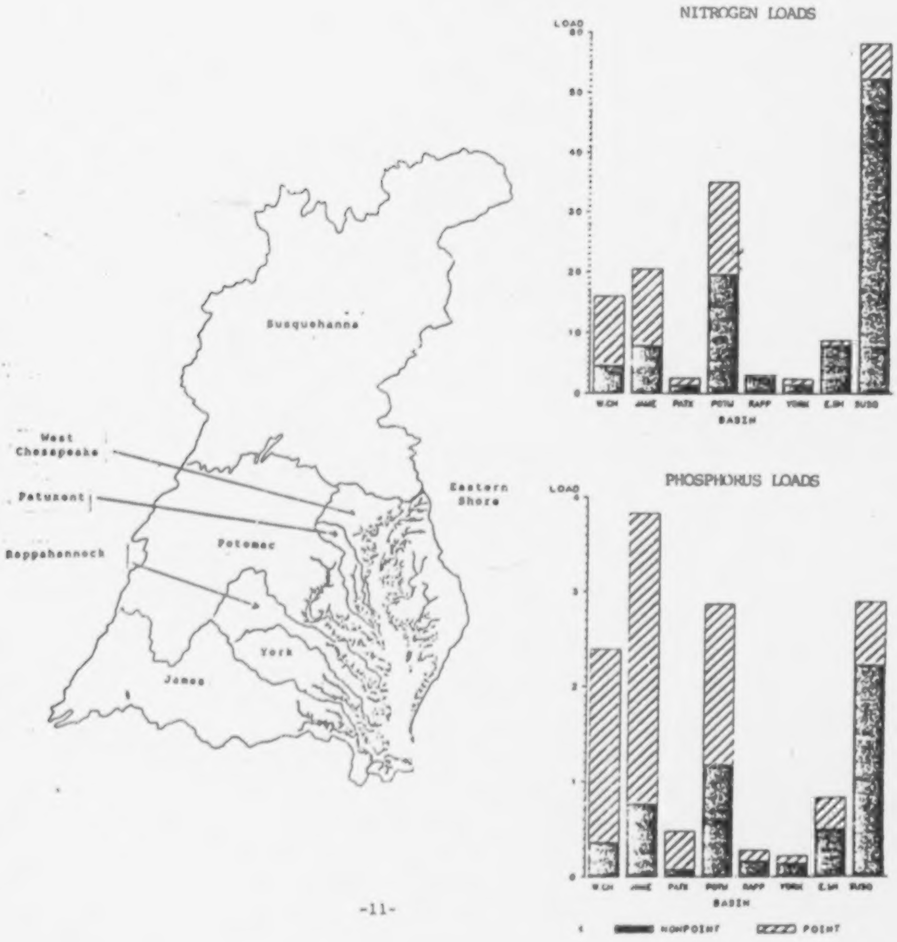
Nutrient control strategies must account for, or at least acknowledge the importance of, seasonal and basin differences in the limiting nutrient. The limiting nutrient is a moving target which responds to:

- Seasonal changes in nutrient processes
- Input events
- Mixing processes
- Salinity
- Nutrient cycling

Seasonally shifting point source nutrient removal technologies in response to the limiting nutrient is not likly to be practical or effective. To successfully base Bay nutrient management on the limiting nutrient concept may require the reduction as much as possible of both nitrogen and phosphorus, particularly in areas that are not tidal fresh water.

With the exception of the tidal fresh portions, there is no spacially or temporally consistent limiting nutrient in the Bay. Seasonal differences in nutrient stocks are dramatic. Even in tidal fresh waters with sucessful control of phosphorus there is the possibility of exporting nitrogen to areas of nitrogen limitation. A nutrient management strategy must take into account basin differences in nutrient stocks, input loads and future trends.

FIGURE VII . POINT AND NONPOINT LOADS (IN MILLIONS OF POUNDS) BY BASIN March Through October. Compiled from Chesapeake Bay - A Framework for Action, Basin Profiles, 1983.



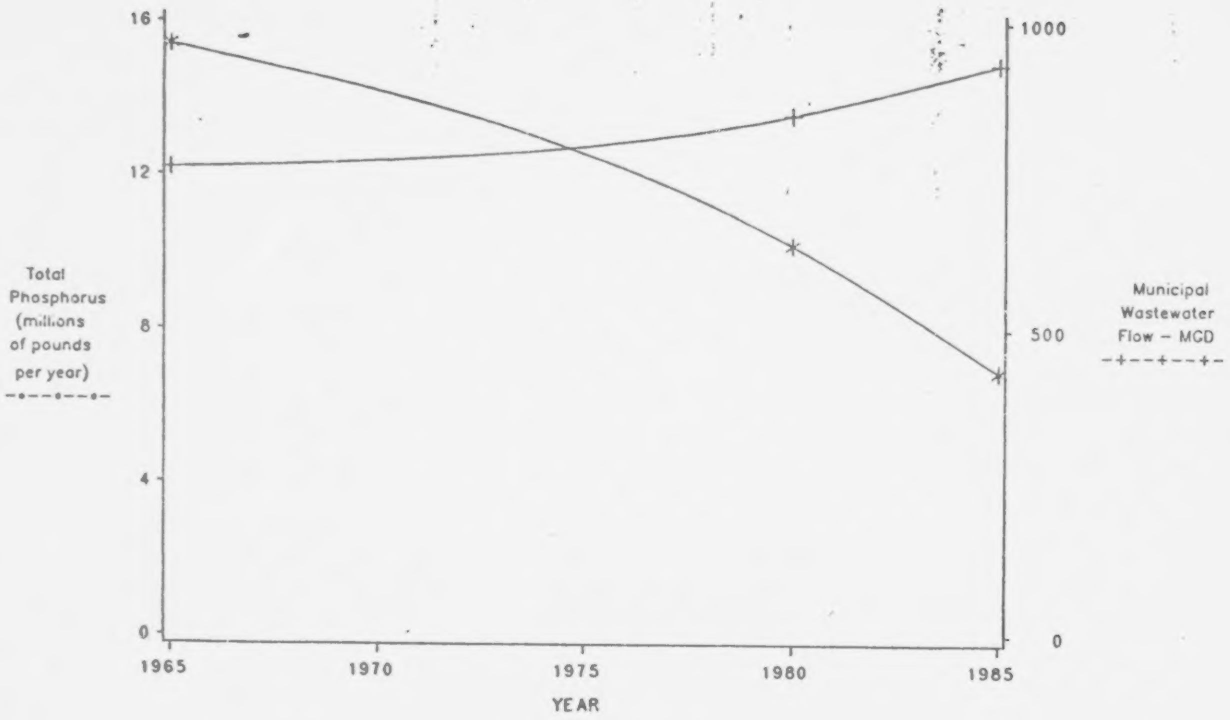


FIGURE VIII.
Annual Phosphorus Discharges and Wastewater Flows Below the Fall Line
and in the Lower Susquehanna From Municipal Sewage Treatment Plants

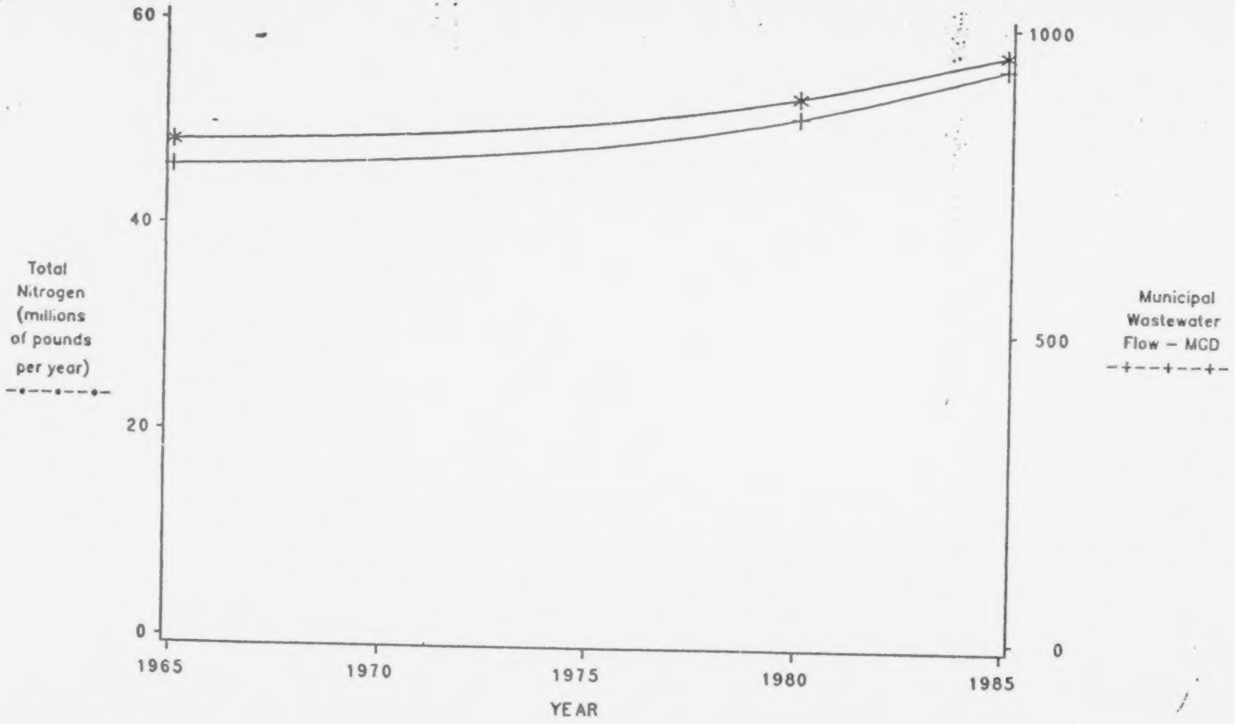


FIGURE IX.
Annual Nitrogen Discharges and Wastewater Flows Below the Fall Line and in the Lower Susquehanna From Municipal Sewage Treatment Plants

RECOMMENDATIONS

- A Bay wide nutrient management strategy should be developed which includes management of phosphorus and nitrogen. This strategy should recognize basin differences in the critical limiting nutrient, nutrient sources, and future trends in nutrient loads.
- Model analysis should numerically refine this strategy.
- " Nitrogen removal should be [considered in all plans for POTW]* upgradings, expansions, and new construction " (STAC, 1986).

* Author's modification.

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ENVIRONMENTAL POLICY INSTITUTE

TESTIMONY OF CHARLES FOX

DIRECTOR, CHESAPEAKE BAY PROJECT

ENVIRONMENTAL POLICY INSTITUTE

BEFORE THE SENATE SUBCOMMITTEE ON GOVERNMENTAL
EFFICIENCY AND THE DISTRICT OF COLUMBIA,
COMMITTEE ON GOVERNMENTAL AFFAIRS

ON THE FUTURE DIRECTION OF THE CHESAPEAKE BAY PROGRAM

JUNE 24, 1986

218 D Street, S.E., Washington, D.C. 20003 (202) 544-2600

ENVIRONMENTAL POLICY INSTITUTE RECOMMENDATIONS

New Chesapeake Bay Agreement

Before 1988,

- o Expand existing inadequate Bay-wide plan. Develop new Executive Agreement between the states and the federal government to institute specific nutrient loading goals for each major tributary. Model the Agreement after the Great Lakes Agreement of 1978. (p. 3,7,8,10)

Before 1990,

- o Amend the Agreement to include water quality standards and loading goals for priority toxic contaminants in the Chesapeake. Include specific goals and objectives for the protection of living resources and habitat. (p. 14,15,16)

Chesapeake Bay Executive Council

Toxics

- o Establish a Toxics Subcommittee to develop standards and Bay-wide loading goals, and recommend appropriate actions for existing toxic "hot spots." Evaluate existing enforcement and pretreatment programs. (p. 14)

Nutrients

- o Immediately adopt and implement a policy to prevent nutrient levels from increasing beyond existing levels. Blue Plains Wastewater Treatment Plant should not expand without nitrogen control or loading goals.(p.10)

Financing

- o Develop strategies to meet financing needs for both point and nonpoint source pollution control. (p. 13)

Federal Agencies

Environmental Protection Agency

- o Consider expanding and redirecting the activities of the Chesapeake Bay Office in Annapolis in light of new priority tasks. (p. 19,20)

- o Revise Advanced Waste Treatment Policy to allow funding for nitrogen removal in the Chesapeake. (p. 20)

Soil Conservation Service

- o Institute a line-item for Chesapeake activities with direction to focus exclusively on water quality and to target resources on a Bay-wide basis. (p. 21,22,23)

- o Eliminate activities like the Chester River Project with substantial adverse impact on water quality. Increase efforts to evaluate water quality benefits of "best management practices." (p. 22,23)

Army Corps of Engineers

- o Provide technical and financial assistance to develop three-dimensional Chesapeake Bay model. (p.24)

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ON THE FUTURE DIRECTION OF THE CHESAPEAKE BAY PROGRAM

JUNE 24, 1986

Mr. Chairman, Bay-Area Senators, Members of the Subcommittee:

I am Charles Fox, Director of the'Chesapeake Bay Project for the Environmental Policy Institute (EPI). EPI is a non-profit, public interest organization engaged in research, public education, litigation, and lobbying. Our research and lobbying are directed at energy, environmental and natural resource issues at local, national, and international levels. We greatly appreciate the opportunity to appear here this morning with such distinguished guests to share our views on the future of the Chesapeake Bay Program.

My statement this morning will briefly define the current overall needs of the Bay Program and then focus on the so-called "Phase II" planning process; its strengths and its shortcomings. I will follow with a discussion of the Chesapeake Bay Executive Council and our specific views on the urgent and difficult tasks

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before it. Finally, I will offer our comments on the important role of the federal government and make suggestions on how local governments may become more actively involved in the Program. (The Environmental Policy Institute's specific recommendations are summarized at the end of this statement.)

At the onset, Mr. Chairman, let me express our deep appreciation for all that you have accomplished on behalf of the Chesapeake over the past decade. Such a thorough commitment is precisely what is needed if this cleanup effort is to be successful. Over the past several years, the Bay has been extremely fortunate to have had leaders like yourself, Governor Harry Hughes and Governor Charles Robb. And from early indications, it seems that Governor Gerald Baliles may quickly equal -- if not surpass -- the efforts of his predecessor.

Such leadership is no trival matter. The Chesapeake Bay must transcend election-year cycles and partisan politics, and remain a top agenda item well into the next century. We can only hope that the future will yield equally prominent and successful advocates for the Chesapeake.

I. Introduction

There is little question that incredible gains have been made on behalf of the Chesapeake Bay over the past several years. More importantly, for our purposes today, there is little question that additional work will be needed if we are to successfully guide the Chesapeake Bay Program into the next century.

The now-famous seven-year EPA Bay study, and the subsequent Chesapeake Agreement between the states and the EPA, were the catalysts for a host of impressive -- and expensive -- initiatives aimed at protecting the Chesapeake. Under the leadership of Governors Hughes, Robb and Thornburgh, new programs were established and existing programs were enhanced in a multi-faceted attack on the problems affecting the Bay. However, the initiatives alone will not provide the necessary long-term framework for Chesapeake management. It is also our view that to accomplish the general goals of the Program, new -- and even bolder -- initiatives will be needed.

First and foremost, we see an urgent need to develop specific goals and objectives, on a Bay-wide basis, to create a blueprint for future actions. The much-heralded "Chesapeake Bay Restoration and Protection Plan" (September 1985) provided general goals and qualititative objectives that were of little use to Bay managers. We feel the plan must be refined considerably, complete with specific goals and quantitative objectives, if it is to effectively guide the future decisions of Bay managers at federal, state and local levels.

In this regard, we believe that an agreement between the states and the federal government would greatly aid long-term management of the Chesapeake Bay. Such an agreement should include specific water quality goals and standards, and could be modelled after the "Great Lakes Water Quality Agreement of 1978" signed between the United States and Canada. With such an approach, the signatories would clearly understand their respective responsiblities in meeting the goals of the Bay Program. Long-term commitments would be secured and the problems associated with changing Administrations at federal and state levels would be minimized. If such an agreement could be negotiated, it would yield tremendous benefit to the Chesapeake Bay.

We believe there is an important, but as yet unfilled, role for the Chesapeake Bay Executive Council in meeting the future needs of the Chesapeake. This body, which was created in the Bay Agreement of 1983, has the prime responsibility to ensure "the implementation of coordinated plans to improve and protect the Chesapeake Bay." As a pratical matter, the Council has performed well in its coordination capacities but has yet to bypass the parochial interests of its member organizations and aggresively tackle important Bay-wide issues. We see a vitally important role for the Council in the coming decade. We will more thoroughly discuss this later in our remarks.

The Bay Program must quickly evaluate the effectiveness of what has been accomplished to date and determine whether new initiatives are needed. It does not have the luxury of waiting the decades that may be necessary to measure a response in the ecosystem. Then, it may be too late. Instead, we must greatly expand our scientific efforts, utilize the results of Chesapeake Bay models which will soon be available, and forge ahead with the same determination that has brought us this far.

II. **The "Phase II" Planning Process**

To meet the future needs of the Chesapeake Bay Program, EPA has developed the so-called "Phase II" planning process for the Executive Council. "Phase II" may be simultaneously one of the most important, yet misunderstood concepts in the Chesapeake community today.

To understand the need for "Phase II", let me briefly explain "Phase I." Contrary to what many think, "Phase I" was not simply the research phase. In fact, "Phase I" was the seven-year EPA study and all of the initiatives documented in the September 1985 Restoration and Protection Plan. "Phase I" established general goals for key issue areas like nutrients, toxics, and living resources and provided qualitative objectives to meet the goals.

In effect, "Phase I" was the immediate response of state and federal governments to clear evidence that the Chesapeake and its tributaries were in grave peril. However, as previously mentioned, "Phase I" alone will not provide the necessary long-term framework for Chesapeake management. It cannot evaluate whether existing initiatives are adequate on a Bay-wide basis or whether more needs to be done. It did not establish specific goals and strategies for the host of problems affecting the Chesapeake.

In this regard, "Phase II" was developed for the Executive Council to enhance long-term management by providing an organized planning process to evaluate Bay-wide needs and recommend appropriate actions. The process involves four major steps: i) defining living resource and water quality goals; ii) determining pollution loads necessary to achieve goals; iii) evaluating alternative strategies to achieve pollution loads; and iv) selecting appropriate management actions. As designed, the process will involve citizens, scientists and government officials at each juncture in the process.

I would like to stress that "Phase II" is, quite simply, just a planning process -- an exercise to evaluate Bay-wide needs and recommend appropriate actions. It is not, as some would think, necessarily an action-forcing mechanism which will result in new initiatives. However, it could be, especially for nutrient problems. What is needed is a firm commitment to the process by the Executive Council, complete with deadlines for decision-making.

For nutrient problems in the Chesapeake, the "Phase II" process will be driven by as-yet-undeveloped computer models to "simulate" the Chesapeake Bay ecosystem. These exceptionally complicated models will be used to determine Bay-wide pollution loads and to evaluate alternative strategies to achieve targeted pollution loads. The first model (a two-dimensional steady state model) is expected to be available by May 1987, while an even more complicated model (a three-dimensional time variable model) is not expected to be available until the fall of 1989 at the earliest.

While models are an important tool to guide Chesapeake decision-makers, we wish to underscore the fact that their predictive capabilities will always be open to question. This is particularly important with respect to the more complicated Chesapeake model expected in late 1989. This model will be "pushing the envelope of technology," as one Bay modeller put it, and as such, serious reliability questions may likely be raised on its findings.

It is our view that a "Phase II" model driven process for nutrients will provide valuable information to the Executive Council. Indeed, we feel it important that the Council commit to using the results of the initial modelling effort and establish specific nutrient loading goals for nitrogen and phosphorus by the end of 1987. These goals should include both point and nonpoint sources; be calculated on a tributary by tributary basis; and include goals for above and below the fall lines on each tributary. As the results of later modelling efforts become available, loading goals and strategies should be refined.

It is less clear how a "Phase II" planning process will significantly aid decision-makers on important problems associated with toxic contamination in the Chesapeake. Given incredible gaps in knowledge, and the likelihood that Bay-wide models will not yield important information on the transportation and effects of toxics for some time, we are not convinced that valuable quantitative output can be obtained at each step in the "Phase II" process. In this regard, it is our view that the Executive Council must assume greater responsibility in this area, absent adequate Bay-wide models, and work to develop specific loading goals, standards, and strategies in the immediate future.

On important living resource and habitat protection problems in the Chesapeake, again it is not clear exactly how the "Phase II" process will significantly help decision-makers. The Bay-wide models will be able to incorporate basic water quality criteria like dissolved oxygen and turbidity but will not adequately evaluate living resource needs like those relating to toxic contamination, subaqueous lands, wetlands, or riparian areas.

In summary, we feel that the "Phase II" process is an important tool when definitive output can be obtained at each juncture in the process. For nutrient problems, we feel it a worthy exercise which should significantly help Chesapeake decision-makers. For other problem areas, it is less clear exactly how it will package valuable information in such a way as to assist Bay managers. Ultimately, it is the Executive Council which must commit itself to address these important issues, whether through a "Phase II" planning process or not.

III. The Chesapeake Bay Executive Council

At this point we would like to present our specific views on the difficult and urgent tasks before the Executive Council. We firmly believe that if the Bay Program is to successfully meet its long-term goals, the Executive Council will have to assume a leading role with the willingness to tackle and resolve the key issues before it. Fortunately, there is a growing consensus among Bay managers on the issues needing immediate attention.

In its brief two-year history, the Council has assumed an important, albeit not too successful, role in the Bay effort. It has greatly improved inter-agency coordination at both state and federal levels. Through the Implementation Committee, tasks have been assigned and completed by the various Subcommittees. The Citizens Advisory Committee and the Scientific and Technical

Advisory Committee have just recently begun to carve their niches and provide important input to the process.

Despite important accomplishments in its coordination capacities, the Council has yet to produce significant results in key issue areas. In fact, the actual output of the Council includes only two resolutions (one on the Farm Bill the other on the Navy's proposed use of organotin anti-fouling paint) and two reports (the Restoration and Protection Plan and the 1st Annual Report). It is our opinion that the parochial interests of the member organizations have greatly dominated the Council and have limited its actions.

We cannot emphasize our view enough that the Council must rise above the interests of its member organizations and begin to tackle the difficult tasks before it. As I stated before, fortunately, there is a growing consensus on the specific tasks needing Executive Council action.

We would like to present our assessment of the top priority tasks before the Council. Let me emphasize that in virtually every case, other Bay organizations like the Chesapeake Bay Commission and the Chesapeake Bay Foundation have identified these areas as needing further attention.

1.) **First and foremost, we firmly believe that the Council should establish specific nutrient loading goals for each major tributary to the Chesapeake by the end of 1987. In the interim,** we believe it only prudent that the Council establish a policy of preventing nutrient loads from increasing beyond existing levels.

It is no longer questioned that excessive levels of nitrogen and phosphorus are a major factor in the decline of the Chesapeake Bay. Both the EPA Chesapeake Bay Study and the Executive Council's Restoration and Protection Plan recommended that nutrient inputs to the Chesapeake be reduced. To this end, the states and the federal government have launched aggressive programs aimed at reducing both point and nonpoint sources of nutrients to the Chesapeake.

However, the Executive Council has yet to define specific goals for reducing nutrient inputs on a Bay-wide basis. We believe that such goals are extremely important to guide the actions of Chesapeake decision-makers in the coming decade. Both Maryland and Virginia General Assemblies recently passed resolutions requesting the development of specific nutrient reduction goals. As mentioned previously, we feel that these goals should be expressed on a tributary by tributary basis.

The need for immediate action on this issue is underscored by the recent report of the Scientific and Technical Advisory Committee (STAC) and the pending proposal to expand the Blue Plains Wastewater Treatment Plant. In the STAC report, excessive nitrogen loadings were pinpointed as having a major role in the nutrient enrichment of the Chesapeake Bay. In fact, STAC recommends that "nitrogen removal should be considered in all plans for plant upgradings, expansions, and contructions." Yet less than ten miles from this hearing room, the Blue Plains Wastewater Treatment Plant is seeking to expand its flow by 20% without additional nitrogen control. Blue Plains is by far the largest treatment plant in the Bay watershed and the expansion would allow an additional 61 million gallons of sewage per day.

By May of 1987 the first Chesapeake Bay model will be available to the Executive Council. That model will provide a basic understanding of important relationships between nutrient loadings and dissolved oxygen problems in the Chesapeake. There is no question that the model will have its limitations, some of which could be addressed in the more comprehensive model expected in late 1989. However, we feel it imperative that the Council utilize the results of the first model to establish nutrient loading goals. The loading goals should be refined when the results of the more advanced model become available.

With respect to the Blue Plains expansion and other sources of additional nutrients, we strongly feel that the Council should adopt and implement the policy of a cap on point source nutrients until loading goals are established.

Simultaneously with these efforts, we see a great need to expand research efforts to document more clearly the effects of nitrogen control on the estuary.

2.) **In conjunction with the establishment of nutrient loading goals, the Council should evaulate financing needs for both point source and nonpoint source control intiatives and develop recommendations for measures to meet these needs.**

A growing body of evidence indicates that future sewage treatment costs could be staggering. Some estimates of the total cost of point source nitrogen removal exceed $2 billion for the Chesapeake Bay watershed. These sewage treatment needs would be over and above the already-high costs of meeting the 1986 National Municipal Policy deadline under the Clean Water Act.

Furthermore, as you are all aware, Congress is reauthorizing the Clean Water Act with the goal of phasing-out the Construction Grants Program within the next decade. This program has provided hundreds of millions of dollars to the Bay watershed over the past several years. The loss of these funds will unquestionably create new burdens to state and local governments.

In addition to the need to develop adequate financing for point source sewage treatment plants, the Executive Council should examine innovative ways to help finance nonpoint source control initiatives. The states deserve great credit for their commitment to expand cost-shared programs for nonpoint source control. Unfortunately, however, the demand for these cost-share funds greatly exceeds supply.

3.) The Council should establish a Toxics Subcommittee to recommend appropriate water quality standards for priority toxic contaminants and work to establish loading goals on a Bay-wide basis. In addition, the Toxics Subcommittee should examine and provide recommendations on appropriate courses of action for existing toxic "hot spots."

In response to the findings of studies on toxic contamination and the Chesapeake Bay, the states and the federal government have stepped-up efforts to control toxic discharges, improve enforcement, establish pre-treatment programs, and enhance toxic monitoring, research and analysis. Despite these efforts however, few will argue that current programs to address these problems on a Bay-wide basis are adequate.

Controlling both concentrations and total loadings of toxic contaminants is necessary to minimize hazards to the Bay and its resources. Currently, however, there are just a handful of water quality standards for toxics in the Bay, and overall loading goals are nonexistent. Legitimate questions have been raised on the "allowable" limits in NPDES permits and the widespread enforcement problems are well known. In addition, emerging pretreatment programs will require great attention if they are to be effective for the long-term.

In the immediate future, there is a clear need to expand toxic research, including assessments of toxics found in key Bay species. Knowledge of the transportation and effects of contaminants in this (or any) estuary is exceptionally poor.

4.) **The Council should more clearly define the respective roles of the Citizens Advisory Committee and the Scientific and Technical Advisory Committee. Specifically, we believe that these Committees should be given better access to resources and a greater voice in the actions of the Executive Council.**

We believe that the roles of the STAC and CAC are vital to the Executive Council and the Chesapeake Bay Program. However, the Council has yet to define their roles in any specific manner. Further, we feel it important that these Advisory Committees are provided greater access to resources so that they can become a much more knowledgeable and influential force in the policies and actions of the Executive Council.

5.) **The Council should work towards developing a "Water Quality and Habitat Protection Agreement" modeled after the 1978 Great Lakes Water Quality Agreement signed between the U.S. and Canada. The Council should establish the goal of developing overall policies and specific nutrient loads by the end of 1987. The Council should amend the agreement to include toxic standards and goals as well as habitat protection measures within the next three years.**

The Great Lakes Water Quality Agreement of 1978, and its 1972 predecessor, have proved a tremendous boon to the long-term management and restoration of the Great Lakes ecosystem. With the Agreement, specific goals and standards have been established, long-term continuity has been maintained, and decision-makers have been provided an effective framework to evaluate actions. On the Chesapeake, we have no such framework. The 1985 Restoration and Protection Plan provides no specific goals or objectives and is of little use to Bay managers.

The Great Lakes Agreement is an evolving process. It has been updated based on new information and shifts in priority attention. An agreement for the Chesapeake should be similarly drafted and implemented.

Beyond the Great Lakes Agreement, we see a need to include specific goals and objectives for the protection of aquatic and terrestrial habitats. Given their key role in the ecosystem, a Chesapeake agreement should negotiate provisions for wetlands protection, riparian area enhancement, and subaqueous lands management. Additionally, it is our view that the agreement should, to the extent feasible, develop policies and goals for land use planning and growth management.

While there are many actions that could be taken by the Executive Council, we feel that these five tasks are realistic and, if effectively accomplished, would greatly enhance the long-term management of the Chesapeake.

IV. The Federal Role

We would like to turn to a discussion of the important federal role in the long-term Bay effort. First, we will present our views on the Chesapeake-specific provisions of the Clean Water Act now pending before Congress. Then we would like to offer our comments on the respective roles of some of the key federal agencies participating directly in the Bay Program.

For openers, let us stress that the federal role is an extremely important one. As many have said quite accurately, it is the glue which binds the Bay Program together. Most importantly, it is a perspective, beyond that of the individual member states, which will become even more important as the Executive Council begins to examine Bay-wide goals and strategies.

We would like to emphasize that direct federal contributions have been extremely modest, especially when compared to the resources provided by the states. Direct federal appropriations for five major agencies have been less than $15 million per year. And at the same time, federal support of other key programs has been, and will continue to be, reduced substantially. Our point is that the $15 million given to the Chesapeake each year is peanuts compared to the hundreds of millions in other federal programs which will no longer be available in the future.

We must note that we do appreciate the growing needs of other estuaries in the nation, all of which have received substantially less than the Chesapeake. However, we think you will all agree that the Chesapeake compares with our nation's Great Lakes as an incredible resource deserving special attention. No other estuary in the country compares to the Chesapeake in size, productivity, and use. It truely has been an integral part of our nation's history and clearly does deserve unique attention.

Both House and Senate versions of the Clean Water Act now pending in conference acknowledge the unique needs of the Chesapeake. Most recently, both versions authorize $13 million for the Chesapeake Bay Program, with $10 million of that available in cost-shared grants to states and $3 million available to the EPA's Chesapeake Bay Program. For the past two fiscal years, the Bay Program's appropriation has been only $10 million, with about $7.5 million available to the states and $2.5 million available to the EPA. These funds were made available by the Administration, absent an authorization, as part of a four-year, $40 million commitment to the Chesapeake. The funds committed by the Administration, and the funds authorized in the Clean Water Act, will only be available through fiscal year 1988.

We believe there is no question that continued federal support past fiscal year 1988 will be necessary for the

Chesapeake Bay Program. In fact, given pressing tasks ahead, we believe it important that Congress provide the full $13 million that will likely be authorized in the Clean Water Act. We believe that the $13 million should be provided for at least another four years, through fiscal year 1992, at which time a continued state grant program could be re-evaluated. There is no question in our opinion that part of the authorization which funds the EPA Chesapeake Bay Program should continue indefinately.

Regarding the specific role of the **Environmental Protection Agency**, as has already been noted, we believe it has an important role as we begin to look at the problems with a long-term, Bay-wide perspective. In this regard, we believe the Bay Program Office should be continued indefinately.

However, Congress and the Chesapeake Executive Council should consider changing the activities, and increasing the funding, of the Bay Program Office in light of the new priority tasks ahead of it. To date, the EPA Bay Program Office has functioned primarily in a coordination and grants evaluation capacity. While this has been appropriate so far, we believe that there will be increasing research, technical evaluation, and analytical needs for the Executive Council. Currenty, of the roughly $2.5 million available to the Bay Program Office, $900,000 goes to monitoring, $500,000 goes to computer services,

$200,000 goes to public participation, and just a little more than $1 million is available for staff salaries, research and technical studies. For contrast, in the FY 1987 Budget for the EPA, the Great Lakes Program total workyears were double that of the Chesapeake Bay Program, while the total budget for the Bay Program was about double that of the Great Lakes Program.

For the most part, the currently modest technical needs of the Bay Program are being met at the Regional Office in Philadelphia and at headquarters in Washington. We do not believe that this will be adequate in the near future. If the Executive Council is to accomplish the difficult tasks before it, substantially greater technical support from EPA will be needed. It is our firm belief that this support would best be made available from the Bay Program Office in Annapolis.

An additional concern of ours regarding EPA involves its Advanced Treatment Policy for federal funding of wastewater treatment facilities. Currently, the Policy does not allow federal funding for nitrogen removal at point sources, even on a pilot program basis. Among others, the Chesapeake Bay Commission has voiced its concern about this policy, specifically regarding EPA's denial of funding for nitrogen removal on the Patuxent River and at the Lambert's Point facility in Virginia. Given the growing body of evidence on the need for nitrogen removal, we share the Commission's view and believe that EPA should support nitrogen removal for these pilot programs and move to adopt a policy of allowing both phosphorus and nitrogen removal funding in the Chesapeake Bay area.

We would like to make a number of specific comments regarding the role of the **Soil Conservation Service** in the Bay effort. As you know, through the work of Senator Spector and other Bay-area Senators, the SCS has committed 31 FTE positions to the Chesapeake Bay effort to assist in nonpoint source pollution control. These positions have proved extremely important, especially given cuts in other SCS programs.

We believe it is important that these positions receive a line-item in the SCS budget with a directive to focus their efforts on water quality, and to target their resources to areas of greatest concern. Currently, the positions are spread throughout the Bay watershed, and though their activities are "targeted" based on state priorities, we see a greater need to focus on Bay-wide priority problem areas. Specifically, we feel that greater attention must be given to the nonpoint source problems of Pennsylvania. Furthermore, we feel it important that the SCS positions focus exclusively on water quality concerns. With a line-item and a specific directive, these Chesapeake positions will yield the greatest benefit to the Bay. Moreover, with a line-item, the long-term commitment so essential to the Bay effort would more easily be maintained.

The focus on water quality is a particularly important issue with the SCS. As you know, SCS responsibilities include far more than just water quality, and in some instances, their activities run counter to the protection of water quality. A case in point is the controversial Upper Chester River Project on Maryland's Eastern Shore. This Project, for which an environmental impact statement will be released within the next month, will unquestionably have significant adverse impacts on wetlands and water quality. Moreover, it will cost the federal government about $2.5 million, or about three times that which was appropriated especially for the Chesapeake. If approved (as looks likely), this project could impact more than 3,000 acres of wetlands according the Fish and Wildlife Service, and would dramatically increase nutrient and sediment loadings to the Chesapeake. The Project will involve about 100 miles of federally-sponsored stream channelization with about 200 miles of additional ditching being done by the locals. We firmly believe that this project, and other similar projects planned by the SCS, blatantly run counter to the efforts to protect and restore the Chesapeake Bay.

Additional questions have been raised about the water quality benefits of the actual "best management practices" or BMPs being implemented by the SCS. Primary attention is focused on reducing soil erosion, and while this certainly has benefits in reducing sedimentation and phosphorus runoff, nitrogen runoff could be increasing dramatically. Furthermore, some of the BMPs may only have minor benefits for erosion control; the grassed filter strips commonly employed are a good example. We see an urgent need for the SCS to revise its standards and specifications for BMPs with substantially greater attention paid to water quality. In this regard, we believe the SCS and other federal agencies should greatly enhance their research on effective water quality management practices to control all forms of nonpoint source pollution.

We also believe that the SCS and other federal agencies should be more actively involved in the ongoing targeting processes in the Bay watershed. Currently, nonpoint source target areas have been identified by the states with only minor input from federal agencies and the Executive Council. In many cases, the "targeted" areas include entire counties or entire watersheds with only moderate attempts to pinpoint those specific areas or farms causing the greatest problems. We would recommend greater attention paid to "actual" nonpoint source problem areas as opposed to current policies which target areas with the greatest "potential" nonpoint source problems.

It is our understanding that the Department of Agriculture is developing a water quality policy to guide its activities. We would highly recommend that the Department adopt a policy consistent with its "Water Quality Field Guide" (SCS-TP-160, 1983) which suggests that no SCS activity should have adverse impacts on water quality.

We would like to add several specific comments with respect to the other federal agencies directly involved in the Chesapeake Bay. First, the **Army Corps of Engineers** has recently requested greater involvement in the development of the three-dimensional time variable model of the Chesapeake expected in late 1989. Given its expertise in this area, we feel it appropriate that the Corps assume this responsibility. Further, we feel it appropriate that the Corps provide the necessary resources to develop the model.

Both the **National Oceanic and Atmospheric Administration** and the **Fish and Wildlife Service** have also commanded unique and important roles in the Bay effort. We would like to stress that their modest activities be continued in Congress' future consideration of program needs. These agencies perform vital research on the Bay's living resources and have effectively overseen and influenced the activities of other federal and state agencies in many different areas.

V. Local Government Involvement

For the remainder of our remarks, we would like to briefly present some ideas on how local governments may become more involved in the Bay Program. As you identified in your questions to witnesses, this is an important aspect of the emerging Bay Program. It is our view that with the exception of Maryland's Critical Areas Program, very little has been accomplished in this area.

With the establishment of Bay-wide goals and strategies by the Executive Council, local involvement in the Bay program will become essential. Most land use decisions are made at the local level, and increasingly, funding decisions will be made at that level too. Master plans for economic development, sewage treatment, and land protection are commonly prepared in local planning and zoning offices which are insufficiently staffed and have few technical resources. Unfortunately, local government structures, responsibilities and concerns vary so widely among the states that across-the-board solutions to the problem are not necessarily the most effective.

There is a growing consensus among Bay managers that ultimately the Bay Program should focus its attention to specific river basin actions, shifting from a macro-management approach to micro-management strategies. Through such an approach, very specific management plans could be developed and implemented consistent with overall Bay-wide goals. Local governments would necessarily become involved as attention shifts to their immediate areas.

Under Sections 208 and 303(e) of the Clean Water Act, various river basin plans have been prepared and adopted throughout the Bay watershed with generally limited degrees of success in helping alleviate water quality problems. Maryland is currently undertaking an extensive update of its river basin plans while Virginia's river basin planning efforts continue in a piecemeal fashion both in terms of geographic scope and consistency in the content of the plans. Currently, we believe that neither states' river basin planning efforts will effectively provide guidance or strategies to local governments.

However, with grant assistance from the EPA Bay Program and the states, the existing river basin plans could be utilized to develop "issue-oriented" implementation plans for select priority river basins and watersheds. With such an approach, EPA and the states would guide the Bay program toward a greater level of specificity and would necessarily stimulate greater local government involvement. EPA and the states could make grants available upon request; could mandate certain components in the plans; and could assure consistency with overall Bay-wide goals. Clearly, both the EPA and the states would have to provide substantial technical assistance to local governments for action plan development and implementation.

As a final thought, through such a river basin approach, citizen and private sector involvement could be greatly improved and expanded as the entire Chesapeake Bay effort became directly linked to their backyards. And as we all appreciate, only then will the Bay effort become truely successful.

We would like to thank you for the opportunity to present our views and hope that our comments have been helpful.

THE ACADEMY OF NATURAL SCIENCES
PHILADELPHIA

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August 7, 1986

The Honorable Charles McC. Mathias, Jr
United States Senate
387 Senate Russell Building
Washington, DC 20510

Dear Senator Mathias:

Dr. Louis Sage is pleased to provide the following responses to the questions posed in your letter of July 21, as part of the followup to his testimony at the June 24 hearing on the future direction of the Chesapeake Bay Clean-up program.

Question 1.
If the 2-D nutrient model shows nitrogen controls to be necessary for the Blue Plains sewage treatment plant, how should we deal with this situation?

Answer:
Available inferential evidence indicates that nitrogen controls are necessary. It would be poor stewardship to delay implementing this treatment capability at a plant as large as the Blue Plains Plant. We should look to innovative biological treatment technologies that would remove both nitrogen and phosphorus. Such systems can be comparable in price to traditional treatment technologies that do not remove both nutrients.

Question 2.
Should "selected tributaries" be designated for implementing specific strategies to obtain direct scientific measurments of the benefits to the living resources?

Answer:
Yes. This is the best way to obtain the reliable information we need on which to base sound management plans.

Question 3.
Should EPA revise its Advanced Treatment Policy to allow for the upgrading of sewage treatment plants to remove nitrogen?

(continued)

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Answer:
Yes. Advanced biological treatment systems should be considered rather than relying on traditional, possibly antiquated systems.

Question 4.
Do you see the need for a coast-wide moratorium on the taking of striped bass?

Answer:
No. Some coastal striped bass populations are spawning successfully, such as those in the Hudson River and in some North Carolina tributaries, so a coast-wide moratorium would not seem to be necessary.

Question 5.
Do you see a need for specific water quality standards and loading goals for the Bay for toxic pollutants? Should EPA develop toxic water quality criteria for estuaries that could help address the problems on the Bay?

Answer:
Yes, to both questions. At present, standards and loading goals are too fluid, so that jurisdictions are reluctanct to go out on a limb in trying to meet them.

Question 6.
Shouldn't we develop a Toxics Action Plan and "Toxics Geographical Areas of Concern" to properly deal with the toxics problem in the Bay?

Answer:
Yes. A screening program for toxics would help. As many as 300 new compounds per year may appear, while full testing of only one tenth that number per year might be feasible. It would thus be unrealistic to try to fully examine all new compounds as they appear. In this situation, a screening program should be used to check all compounds and provide early warning of those that should be tested more fully.

Question 7.
Should there be changes in the NPDES permitting sytem and enforcement policies for activities that pollute the Bay?

Answer:
Minor "fine-tuning" of the NPDES permitting system could be beneficial, but major surgury is not needed. Alarmist stories in the press should not cause us to lose sight of the fact that the NPDES system, while imperfect, has been a major milestone in improving our nation's surface water quality.

The Honorable Charles McC. Mathias, Jr.   August 7, 1986
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Please feel free to call me (at 215/299-1081) with any questions regarding Dr. Sage's responses. He is on vacation until August 25, but will be available if needed.

Sincerely,

Daniel Snyder

Daniel H. Snyder, Special
Assistant to the Vice Pres.
Environmental Research

THE CHESAPEAKE BAY PROGRAM

George S. Dunlop, Assistant Secretary
for Natural Resources and Environment
U.S. Department of Agriculture
before the Senate Subcommittee on Government
Efficiency and the District of Columbia.

Mr. Chairman, members of the subcommittee, and distinguished guests, I am pleased to be here today to represent the U.S. Department of Agriculture (USDA) on the Chesapeake Bay Program. On behalf of USDA and Secretary Lyng, I would like to express my appreciation for the opportunity to appear before your subcommittee, along with the representatives of other federal agencies, to present our views on the future direction of efforts now underway to clean up the Chesapeake Bay.

The environmental problems facing the Chesapeake Bay are well known - as is the public support for the cleanup efforts.

Accelerated federal funding for the current Chesapeake Bay Program was established in response to President Reagan's statement of support in his 1984 State of the Union Address. Agricultural land uses within the watershed have been identified as contributing sources of pollutants and as you know, USDA agencies have been participating in all aspects of the Chesapeake Bay Program.

One example of the effort which is being put forth by USDA to examine agricultural impacts on the Bay is a study which has been funded in part by USDA's Cooperative State Research Service (CSRS). The project is a cooperative effort between USDA, Cornell University in New York, the University of Delaware, the University of Maryland, and the University of Pennsylvania. The purpose of this project is to evaluate the potential regional environmental impact of the chemical treatment programs used in no-till corn production in the northeast, and to establish a data base for the development and testing of water quality models. I will submit for the record detailed information regarding this program, including a March 1986 progress report.

The interstate and multi-state nature of the problem suggests that the federal government maintain some sort of coordinating role beyond the suggested 1988 expiration date. Federal programs, particularly those of the Department of Agriculture, will continue to be available to the citizens of the Bay watershed, but program effectiveness will be enhanced if applied in a coordinated manner.

Following President Reagan's commitment to help, a mechanism to authorize the Environmental Protection Agency (EPA) to provide the necessary resources was established by the Administration. With the exception of EPA's continuing coordination function, we do not see a specific need to have special reauthorizing legislation to continue restoration efforts. The current Chesapeake Bay Agreement, signed in 1983, provides a structure for the regional coordination needed to support the environmental management of the Bay system.

The coordinating mechanism established under the 1983 agreement is cumbersome and expensive. The committees established under the agreement are large and meet often, with extensive involvement in day-to-day activities. It is our judgment that these committees be restructured to establish and monitor the activities of the states and participating federal agencies with much less involvement in day-to-day activities of the work underway. They should have a broader oversight function and provide the integrated long-range planning needed by those who are attempting to redirect their efforts to help alleviate Bay problems. Addressing questions of overall policy as a principal activity would be very helpful to those managing program activities on a daily basis.

In the absence of definitive, quantified goals, we cannot comment specifically on the level of USDA resources needed to effectively accomplish the objectives in Phase II.

Specific numerical goals are needed to allow federal agencies to measure and report progress as they implement a variety of programs in the Bay drainage area. It would be advantageous now to reach agreement on interim goals. This would enable both federal and state agencies to report what is being accomplished rather than what actions were undertaken. We believe that these goals should initially be established as river load reduction goals for each pollutant of concern from nonpoint sources of pollution after effluent standards have been established and implemented for each known point source. This is not a new process. We believe the Chesapeake Bay Program could follow the example set by the EPA Great Lakes effort to document a process that will be successful. Once the pollutant loads in the rivers have been set and agreed to, basin plans can be developed to accomplish these reductions. States, not the federal government, are responsible for meeting the water quality goals established. The burden of deciding the load reduction goals should be properly the responsibility of the State Water Quality Agencies.

Concern for living resources and habitat protection must be provided for by the state agencies as they develop realistic load reduction goals for the pollutants of concern. This is the normal and accepted process for the establishment of water quality standards and desired water uses as described in EPA regulations.

Research has shown that Bay pollution comes from a variety of places, including industrial operations, sewage treatment facilities, residential areas, highways, croplands, and forests. Research also indicates that though agriculture is not the only source of nonpoint source pollution, it is one of the most prominent. This does not mean that other sources do not significantly affect the health of the Bay system. We are continuing to review the standards and specifications for all the conservation practices that are utilized in the Chesapeake Bay area. And, we are actively engaged in activities designed to prevent nutrients and agricultural chemicals from reaching the Bay. This work involves the use of demonstration plots to show farmers how to keep fertilizers and agricultural chemicals on the farm and to evaluate alternative nutrient management systems. These efforts are conducted cooperatively by the Soil Conservation Service, the Extension Service, and the Cooperative State Research Service.

The Food Security Act of 1985 has added a number of new initiatives that will contribute significantly to the Bay cleanup effort. These include the Whole Herd Dairy Buy Out Program, the Conservation Reserve Program, and the soon to be implemented Highly Erodible Land Conservation and Wetland Provisions. By retiring highly eroding lands from crop production under the Conservation Reserve Program and reestablishing a permanent vegetative cover for at least a 10-year period, pollutant load reductions in sediment, nutrients, and pesticides will be achieved. The retirement of whole dairy herds for a 5-year period could also cause a significant reduction in phosphorus and nitrogen production in the drainage area of the Bay. The reductions in pollutant loadings will be supplemented by the highly erodible land provisions of the Food Security Act of 1985. By 1995, all farming on highly erodible lands will have to be in accordance with an approved conservation plan or system if the farmer is to be eligible for the benefits of other USDA price support, farm loan, crop insurance, and disaster payment programs.

In addition, the three states comprising the Susquehanna River Basin, Maryland, New York, and Pennsylvania, have entered into a Tri-State Agreement pledging the support of their respective forestry agencies to (1) reduce nonpoint source pollutants through establishment of forested filter strips, (2) manage protected areas adjacent to the Bay, and (3) establish 64,000 acres of forest plantings on critically eroding marginal cropland in the upper reaches of the Basin. The bulk of these plantings will be established in New York which, although not a member of the Chesapeake Bay Program, has recognized the impact of pollution originating on its unprotected cropland has on the Bay.

As a result of focusing federal assistance, $25,000 in Fiscal Year 1985, Maryland and Pennsylvania were able to develop plans for forestry practices to "Save-the-Bay." This in turn resulted in $147,000 from EPA being made available to carry out planned activities. In FY 1986, New York received Forest Service funding for a focused project to develop an extensive information and education program which is designed to show the benefits of sound forest management on private lands in controlling erosion.

The organizational structure of the USDA delivery system that is used by the states to reach land users contributes to the Bay cleanup effort. The Soil Conservation Service, the Agricultural Stabilization and Conservation Service, the Forest Service, and the Extension Service are among the agencies contributing significant services ranging from technical assistance to monetary support.

In addition, the committee will be interested to know some of the specific educational and informational projects involving agriculture and in relating these things let me stress that this is a cooperative effort of USDA agencies, the Environmental Protection Agency, and individual state agencies and institutions.

In Pennsylvania, the major focus is on the contribution of nutrients from very high densities of livestock and from fertilizers. The program committee in Pennsylvania has, however, deliberately focused its attention and its educational programs on the impact of these nutrients on the farmers' ground water resource (their source of drinking water). The rationale is that while many Pennsylvania farmers may not be too concerned about the Chesapeake Bay, they have a vested interest in protecting the quality of their own drinking water. Such a reasonable entree to nutrient management is much more "saleable" to Pennsylvania farmers; and better management of such nutrients, pesticides, or both, will surely decrease the inputs to the Susquehanna River, and ultimately, to the Chesapeake Bay. In Pennsylvania, Cooperative Extension is working full-time on Bay-related nutrient management programs.

This does not include the several extension agents who are using such information in their programs, nor does it include the Pennsylvania State University faculty who is involved in various aspects of the research that provides the basis for such educational programs.

In Maryland there is a cooperative effort involving the Agricultural Experiment Station of the University of Maryland, the Agricultural Stabilization and Conservation Service of USDA, the Coopeative Extension Service, the Maryland Association of Soil Conservation District, the Maryland Department of Health and Mental Hygiene, the Maryland Department of Natural Resources, and USDA's Soil Conservation Service. A highly successful program, "Maryland Farmer, Partners with the Bay," reaches thousands of farmers and landowners. The Cooperative Extension is involved with information and education programs which affect the quality of water in direct tributaries, such as the Patuxent River and the Tred Avon River, and indirect tributaries such as the Monocacy River, which reaches the Chesapeake via the Potomac River. Maryland Cooperative Extension has provided information programs about "Best Management Practices" for farmers via conventional extension publications and special fact sheets, and for more diverse audiences via "The Bay Book," which addresses domestic and institutional sources of nonpoint pollution as well as agricultural.

Cooperative Extension in Virginia has developed a number of programs to address agricultural nonpoint source contributions to the Bay. These are typified by a special position created to deal with agricultural nutrients from livestock wastes. This position was established to work on a multi-county program area and is headquartered in Fredericksburg, Virginia. Other programs dealing with such varied topics as conservation tillage and soil nutrient management receive program leadership from area offices, county offices, or from Virginia Tech (at Blacksburg). Sixty-eight counties have active Bay-related programs.

In addition to such separate programs, the states which impact the Bay also have cooperative programs to address common concerns. One such program, involving New York, Pennsylvania, Maryland, Virginia, West Virginia, and Delaware, produced a bulletin entitled, "Best Management Practices for Nutrient Uses in the Chesapeake Basin." The bulletin is just one example of the coordinated efforts to develop effective, cost-efficient extension programs to help in restoring the Bay.

Mr. Chairman, I would be remiss if I did not take note of the role which you have played for many years in the effort to clean up the Chesapeake Bay. The President, Secretary Lyng, and I share your concern that we must not fail in the effort to protect, enhance, and promote this valuable national resource.

The Chesapeake Bay is more than a body of water. To the commercial fisherman it is a source of income. To the sport fisherman it is the source of endless hours of enjoyment. The Bay provides jobs for longshoreman. It provides a place of recreation for boaters, and for thousands of families. To the environmentalist, it is a wildlife habitat. And, all Americans respect the heritage and beauty of the Chesapeake Bay. It is part of our history, it is part of our culture and what America is all about.

Mr. Chairman, we look forward to a fruitful partnership with the citizens of the Chesapeake Bay area as we continue to address this important environmental issue in the years to come.

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250

AUG 2 [illegible] 1986

Honorable Charles McC. Mathias, Jr.
United States Senate
Washington, D.C. 20510

Dear Senator Mathias:

We appreciate the opportunity to respond, for the record, to the additional questions from members of the Senate Subcommittee on Government and Efficiency and the District of Columbia concerning the future direction of the Chesapeake Bay Clean-up effort.

As you know, the leadership for the restoration effort rests with the U.S. Environmental Protection Agency (EPA), the District of Columbia, and the states within the drainage area. The Department of Agriculture, while not in the lead role, is a full partner in this effort. We are providing both technical and financial assistance to the agricultural landowners while providing technical support to the ongoing state nonpoint source control programs.

We, as well as EPA, have put our emphasis into the states that are signatory to the Chesapeake Bay Agreement and will adjust our priorities as Delaware, New York, and West Virginia agree to support the restoration effort.

Our response to your specific questions are enclosed. We hope that you will find them useful to your effort to protect this national resource.

Sincerely,

Geo. S. Dunlop

GEORGE S. DUNLOP
Assistant Secretary
Natural Resources and Environment

Enclosure

1. Governor Hughes in his written testimony indicated that Maryland has "not come up with good answers to the question of how we would go about controlling land use and urban sprawl," although he alludes to the Critical Areas concept and a few other programs that benefit the Bay. The population in the Bay's watershed is anticipated to reach 14.6 million people by the year 2000, posing a potentially overwhelming pollution burden on the Bay's living resources and water quality. What land use strategies should be instituted to deal with this reality?

The Department has long advocated wise use of land, water, and other natural resources. While land use control is a state program prerogative, USDA agencies are available to assist states and local communities with their task. We provide natural resource inventory information (including soils maps, soil interpretations, etc.); individual, group, and community planning assistance; cost sharing to encourage application of conservation practices; and other forms of technical assistance. In addition, we provide research and educational programs to continue to up date our efforts and inform others about alternatives they can consider in solving resource problems. We will provide and have provided assistance to help states and others develop land use strategies to protect, restore, and maintain a quality environment. At the same time we are continuing our efforts to promote proper land management on agricultural lands to minimize any adverse impacts to surface and ground water.

2. The key to saving the Bay is for everyone to take individual responsibility for his or her actions. Since the agriculture program is voluntary, I would like to know what percent of farmers have adopted BMP's. Has agriculture revised a monitoring program to test the efficacy of BMP's in terms of water quality? What percentage do you project? My understanding is that BMP's are designed to primarily improve production and retain soil, not necessarily to protect Bay resources. What BMPs have you instituted specifically to improve water quality, hence living resources?

Best Management Practices (BPM's) is a term that evolved in the amendments to the Clean Water Act of 1972 when it was recognized that it would be impractical to eliminate nonpoint source runoff to surface waters. It was also recognized that an effective control strategy would be the application of management practices to the land to minimize such inputs.

For agricultural land, combinations of conservation practices selected to protect the soil resource base for productivity are generally applied to reduce runoff to surface water and such combinations are being used and tested for effectiveness in the Chesapeake Bay watershed. These combinations will differ for each farm and must include adequate consideration of the farm operation as well as soil condition, topography, rainfall, and distance to a water course.

To effectively address water quality problems within an agricultural watershed, pollutant load reduction goals must be developed so that land management practices can be applied to ensure the change in water quality desired. The two key elements are the load reduction goals and cumulative effectiveness of the land management activities. Water quality measures the cumulative effectiveness of land management and seldom, if ever, can it be used to evaluate a single activity.

There presently is no system to measure the implementation of BMP's in the drainage area to the Chesapeake Bay. The states are attempting, however, to develop a process to monitor all individual land management practices applied. USDA agencies are cooperating with them on this effort.

For the reason above, we cannot provide the information you request on BMP's and the percentage of farmers installing such measures.

The enclosed chart provides a measure of activity within the states by showing the number of individuals or groups contacted by Soil Conservation Service personnel and the number actually installing a conservation practice.

You will note that as a result of the additional funding provided to SCS by Congress and the development of state programs, both the number of contracts and the number of practices installed increased from FY 1984 to FY 1985. The cumulative effect of these conservation practices will directly relate to load reductions to the Bay system.

3. While several Best Management Practices (BMP's), such as conservation tillage, retain sediment on the land, they also tend to keep water on the land where it can sink to ground water layers taking with it nitrogen and other compounds. What is the Agriculture Department doing to combat this potential pollution of ground water?

Agriculture is increasing its emphasis on ground water matters. We have funded research and are cooperating with EPA and USGS on several task forces sharing data about ground water problems. Currently the Department is considering development of a Nonpoint Source Water Quality Policy and a Ground water Policy to help clarify Departmental policy on these matters for our many field personnel. We have several projects within the Chesapeake Bay focusing on ground water conditions and how individual BMPs may effect them.

Again as stated earlier, we are also focusing on a review of all soil and water conservation practice standards and specifications to ensure they adequately address the issue. We share your concern to minimize the situations where we solve one resource problem and create another.

4. The Agriculture Department appears to be pursuing two conflicting policies regarding farm land on the Eastern Shore. On the one hand, it is requesting permission to construct an extensive ditching network within the sensitive Upper Chester River watershed in an effort to lower the water table to create more productive farmlands. On the other hand, the Department is aggressively encouraging farms to sign up for its Payment-In-Kind program to keep thousands of acres out of production. How is the Department reconciling these conflicting goals on the Eastern Shore.

The Department of Agriculture has many programs which provide a variety of services to private individuals and groups. While a possible policy conflict may be perceived between the provisions of the Food Security Act of 1985 and the Upper Chester River Watershed project, we believe that we are providing legally the services intended by Congress.

CHESAPEAKE BAY CONTACTS FY 84 & 85

STATE	CODES	STATE TOTALS FY 84 NUMBER	STATE TOTALS FY 85 NUMBER	C. BAY WATERSHED %OF STATE	STATE	CODES	CHESAPEAKE BAY AREA TOTALS FY 84 NUMBER	CHESAPEAKE BAY AREA TOTALS FY 85 NUMBER
DE	102	[illegible]	2136	0.349	DE	102	580	745
	106	898	1317	0.349		106	201	460
MD	102	7225	13263	0.966	MD	102	6979	12812
	106	2081	2766	0.966		106	2279	2614
NY	102	15609	19670	0.126	NY	102	1967	2478
	106	7223	10591	0.126		106	911	1333
PA	102	23882	24936	0.492	PA	102	11740	12268
	106	12377	14317	0.492		106	6088	7042
VA	102	19194	20034	0.533	VA	102	10346	10690
	106	7993	9475	0.508		106	4073	5107
WV	102	14315	14317	0.145	WV	102	2076	2076
	106	4312	4310	0.145		106	625	625
STATE TOTALS:	102	82091	94888		C. BAY TOTALS:	102	33766	41286
	106	34857	42116			106	14276	17152

NOTE: CODES = 102 - Individuals or Groups Assisted
106 - Individuals or Groups Applying Practices

The Upper Chester River Watershed project was authorized for planning in 1977 and approved for operations in 1983. The purpose of the project was to provide agricultural water management and flood protection as requested by local sponsors. As a result of the concerns for the bay's living resources and for the protection of wetlands, the original plan is being modified to protect these resources. Public input received during the planning process will help ensure coordinated actions by the citizens of the area. Water control structures will be proposed that will utilize and enhance the natural resource values of the area while providing public benefits in terms of increased flood protection and pollution abatement. While it may be true that some productivity enhancement may result to existing agricultural lands, the project is not designed to bring new land into agricultural production. Enhancing the productivity of the existing agricultural lands would tend to delay the conversion of these lands to nonagricultural use. Further, there is some scientific evidence which suggests water quality can be enhanced through a carefully crafted, environmentally responsive project like this one.

None-the-less, under current policy, USDA would not provide project planning assistance to the Upper Chester River Watershed project if planning assistance was requested today.

5. It is felt by many in the scientific community that agricultural ditches, or drainage channels, used to drain water from fields, threaten to permanently disrupt the delicate ecosystems that are associated with wetlands. What evidence does the Department have regarding the environmental impact of agricultural ditching on adjacent wetlands? Does the Department intend to pursue its plan to construct a 400-mile drainage network in the Upper Chester River?

Indiscriminate drainage of agricultural lands can cause permanent damage to aquatic ecosystems in the same manner that urban sprawl affects land based ecosystems. Studies have shown that planned communities can be built without such permanent effects on the ecosystem and that planned water management systems can be accomplished with similar positive effects. The Upper Chester River Watershed project plan has been modified to reduce channel improvements. It now includes 97 miles of project channels in Maryland and Delaware. Additionally, the sponsors have identified approximately 120 miles that have potential for construction with local and state funds. The wetlands conservation provisions, commonly referred to as "swampbuster," legislated in the 1985 Farm Bill would reduce the potential for draining wetlands for new crop production.

However, water management and drainage must go hand-in-hand if we are to provide the mix of benefits possible. Water storage can be used to control flows and hence flooding, maintain adequate flows for instream fisheries during periods of drought, and to maintain wetlands under such conditions. USDA has also conducted specific studies as a part of the environmental evaluation process regarding the environmental impact of agricultural ditching on adjacent wetlands. The results of these studies will be documented in the supplemental environmental impact statement developed for the project and will be used to modify earlier ditch designs to minimize adverse effects on adjacent wetlands.

A decision on whether to proceed or not, will be made on the basis of ultimate findings in the Environmental Impact Statement. If favorable, we plan to fulfill our contractual agreement with local sponsors based on current priorities and the availability of funds.

6. How do you ensure that Bay objectives are integrated in your agency's programs? What mechanisms are used to assure that Bay goals are considered when making program budget decisions affecting environmental problems on the Bay?

The priorities for the bay cleanup effort are developed through three specific committees--the Executive Committee, the Implementation Committee, and the Nonpoint Source Committee. Through our representation on these committees and our people working directly with EPA's Chesapeake Bay Program, we are able to coordinate our ongoing programs.

The conservation programs of the Department, as you know, are primarily voluntary programs which are administered in accordance with priorities established at the state and local level. The broad acceptance of the basic bay goals by the citizens of the bay drainage area is resulting in an increased emphasis on activities that will benefit the cleanup effort.

7. I believe everyone would agree it is essential that we look for ways to ensure continuity of the Chesapeake Bay Clean-up Program. As an important first step, the EPA and the Governors have done a wonderful job in developing the Chesapeake Bay Restoration plan which established general goals for the clean-up effort. As a next step, Lee Thomas indicated that he would like to see the Executive Council forge a new Chesapeake Bay Agreement, perhaps using the Great Lakes Water Quality Agreement of 1978 as a model, which would establish specific Bay-wide strategies, water quality standards, and load limits for the Bay and its tributaries. How do you view Mr. Thomas' proposal and what time frame should we be talking about.

We are already on record in support of developing quantified load reduction goals for the pollutants of concern in the Chesapeake Bay. We are keenly aware of the need to focus today's limited resources and manpower to those land areas that will result in the greatest reduction in pollutant delivery.

Target goals should be established immediately for each of the defined drainage areas with specific tributary target loads established where appropriate. Once these are in place it will be possible to coordinate the many programs now available to the bay cleanup effort.

STATEMENT OF

ROBERT A. STONE

DEPUTY ASSISTANT SECRETARY OF DEFENSE

(INSTALLATIONS)

BEFORE THE

SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY
AND THE DISTRICT OF COLUMBIA

GOVERNMENTAL AFFAIRS COMMITTEE
UNITED STATES SENATE

TUESDAY, JUNE 24, 1986

INTRODUCTION

I am pleased to be with you this morning to discuss with you the Department of Defense's actions in support of the Chesapeake Bay cleanup effort. Our goal is to be good neighbors and an asset to the Chesapeake Bay as we accomplish essential Defense missions. We have made significant progress toward this goal in recent years, but also realize that, as with industry, we have more work left to be done.

EPA/DOD JOINT RESOLUTION ON POLLUTION ABATEMENT IN THE CHESAPEAKE BAY

In September 1984, Mr. Caspar Weinberger, our Secretary of Defense and Mr. Bill Ruckelshaus, EPA Administrator at the time, signed a resolution agreeing to cooperate in a number of ways to help clean up the Chesapeake Bay. I am happy to report to you today that this resolution has helped both agencies focus their efforts on the Bay. We are making progress in a number of areas and will continue to do so. Under this agreement, we spent approximately $17 million of Defense funds during FY 1985 for 19 cleanup projects in the Chesapeake Bay region. We have also given funding priority to a number of new projects programmed for FY 86. These range in scope from a $51,000 project to improve marine wastewater collection at the US Navy's Amphibious Base, Norfolk, to a $1.6 million project to upgrade oil spill prevention facilities at the US Naval Air Station, Norfolk. Other projects programmed include approximately $107,000 to repair fuel oil dikes at Andrews Air Force Base, and $420,000 for a program to begin testing all underground storage tanks at Fort Eustis. We are working actively with the US Environmental Protection Agency, especially personnel from EPA Region III, to look at the DoD's National Pollutant Discharge Elimination System (NPDES) permits, to insure that all our permits are up to date and that they define appropriate discharge levels. EPA is providing us with considerable technical expertise and assistance in tackling such tough issues as how do we monitor and control chemicals when conventional permitting procedures aren't possible. Even when not required by existing permits, we are looking for ways to minimize our discharges of excess nutrients, toxic substances, and sediments from soil erosion.

DOD'S CLEANUP PROGRAMS

I am often asked what is DoD's impact on Chesapeake Bay. This seeminqly simple question is not a technically easy one to answer. My rough estimate is that discharges from Defense installations account for less than 5% of all discharges to the Chesapeake Bay. While not a dominant source, I fully agree with those who say we should control our discharges to an even greater degree.

What programs have we initiated over the past several years? I'll give you a few examples. We've upgraded many of our sewage treatment plants with such advanced wastewater treatment techniques as nitrification, phosphorous removal, ultraviolet disinfection, and improved sand filters. A new plant completed at Fort Meade in 1984 cost about $23 million, for example. Upgrades have been made at places such as Aberdeen Proving Ground and Fort Detrick, and installations such as Fort Belvoir and Naval Shipyard, Portsmouth, have been connected to municipal sewage treatment systems. DoD has also initiated a program to improve the operation and maintenance of its existing sewage treatment plants. Pilot studies being conducted at Edgewood and Quantico have evaluated existing plant operations. They will recommend both quick fixes which can inexpensively improve operations in a short period of time, as well as major construction projects, and will provide site-specific operator training and follow-up visits. Generic guidance developed from these studies will be made available to DoD sewage treatment plant supervisors nationwide.

Resource management programs have enhanced soil conservation, wetlands preservation, and shoreline erosion programs at many Defense installations. For example, Fort Meade's wetlands management program has resulted in increased waterfowl nesting areas. The Marsh Run Wetland area at New Cumberland Army Depot has been left undisturbed and has active habitat and wildlife enhancement programs. Wetlands have actually increased at Aberdeen, where more than two thousand acres have been added since 1965, when several beavers were released in a cooperative program with the State of Maryland.

The Installation Restoration Program (IRP) is being conducted at all Defense installations to systematically identify, evaluate, and where necessary, clean up former waste disposal sites. Many millions of dollars have been spent on this effort, and much work remains to be done

Specific projects such as these will continue to receive our priority attention. Concurrently, to better understand the Defense impact on the Chesapeake Bay, my office initiated a half million dollar effort in October 1985. Although much work remains to be completed, I can report some very preliminary findings from this study of Defense's 66 installations in and around the Chesapeake Bay.

What we are beginning to find out from this study is that at about half of these Defense installations we are not polluting the Bay. This allows us to focus on the remaining half where we are not sure what our impact is. At seven installations -- Aberdeen Proving Ground, Harry Diamond Lab-Blossom Point, Letterkenny Army Depot, Naval Air Station-Oceana, Naval Ordnance Station-Indian Head, Naval Shipyard-Norfolk, and Sewell's Point Navy Complex -- our preliminary data suggest we need to do better to eliminate existing and potential pollution discharges. These are the installations where we are focusing our greatest energies. Another 24 installations are places where, because of the nature of our operations, there is some potential for pollutants to be admitted to the Bay. At these installations, we are investigating how to minimize our impact wherever possible.

At all of our facilities, if we know how to eliminate or reduce our pollution discharges, we will do it. If we don't know what to do, we will work closely with EPA to find the right answers. Data from our DoD study, scheduled for completion in October 1987, will help us do a number of things: (1) reduce our water discharges of phosphorous, nitrogen and other conventional pollutants, (2) minimize our toxic chemical emissions whenever possible, and (3) reduce the potential for groundwater contamination from buried hazardous waste sites and underground storage tanks.

FUTURE DIRECTIONS

The current Chesapeake Bay agreement has produced studies which helped define the Bay's problems. I think the time has now come for us to focus on pollutant discharge minimization. Private industry and DoD alike have made progress but more work is needed. Our Joint Logistics Commanders, who are in charge of all our big industrial installations, think this is so important that they have set up a special program to ensure that Defense takes a leadership role in minimizing pollutant discharges.

Do I think the Chesapeake Bay Agreement should be extended? Clearly the Agreement has fostered a spirit of cooperation among a large number of organizations and individuals. Many valuable projects and studies have been pushed to fulfillment, and an impressive publicity effort has been undertaken. Just as clearly, the Bay will not magically be freed of all its problems by 1988.

I believe the spirit of cooperation engendered by the Chesapeake Bay Agreement should not be lost. In this regard, a formal mechanism of coordination and cooperation may still be needed. At the same time, I really believe dischargers must increasingly demand the best available engineering practices for their facilities -- something no agreement can guarantee. We must design engineering controls on a site-by-site basis, and that involves intensive interaction between our state and federal regulators and those of us who pay the bills to reduce pollution. I sense the strong interactive climate we now see emerging as the way to go. Working out control agreements which are realistic, not bureaucratic paper work, is what is needed.

Like industry, Defense has achieved many, but not all, our pollution abatement goals. The flourishing blue heron rookeries I observed during a recent helicopter tour of Aberdeen Proving Grounds are but one visible example of the improvements we are making throughtout the Bay. Yet, substantial improvements are still required. As is true at many older industrial complexes, practices used at Aberdeen in the past are not what we would like to see today. Innovative technical and engineering solutions are required, and substantial resources will be needed. For Defense to achieve these goals, cooperation will be required from both regulatory agencies and from Congress. But, Defense is committed to continuing to do what is necessary to clean up the Bay.

In summary, I'd like to leave you with two points. First, we have made considerable progress in Defense in instituting a number of design and construction projects which will, in fact, reduce our discharges of pollutants into Chesapeake Bay. Second, our job is not yet done. The more we learn about Chesapeake Bay the more we realize that all pollutant discharges must be minimized. While Defense is a small part of the total pollution loading to the Bay, we recognize that we must practice leadership and that we, like industry, must do all we can to be good neighbors and an asset to the Chesapeake Bay community. Our goal of excellence in the quality of life at all our military installations requires our priority attention to this complex problem.

Thank you Mr. Chairman. I'd be happy to entertain any questions.

TESTIMONY OF
JAMES CURTIS MACK, II
DEPUTY ADMINISTRATOR
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

BEFORE THE

SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY AND
THE DISTRICT OF COLUMBIA
COMMITTEE ON GOVERNMENTAL AFFAIRS

UNITED STATES SENATE

JUNE 24, 1986

Mr. Chairman and Members of the Subcommittee:

Good morning, my name is James Curtis Mack, II. I am Deputy Administrator of the National Oceanic and Atmospheric Administration (NOAA). I am pleased to have the opportunity to appear before this Subcommittee to describe NOAA's activities on the Chesapeake Bay and to respond to the questions raised in your letter of invitation.

In November 1984, NOAA signed a memorandum of understanding with the Environmental Protection Agency to participate in the clean-up and restoration of the Chesapeake Bay. That agreement enhances NOAA's already extensive commitment to strengthen data, research, and management activities in the Chesapeake Bay. I would like to review with you some of our involvement in the Bay.

The focus of NOAA Chesapeake Bay studies is threefold: to undertake fishery resource assessments, to examine problems of oxygen depletion, and to improve fishery statistics. To guide these studies, the NOAA Estuarine Programs Office developed a study plan which identified priority research needs for each of the three areas, and included guidance for identifying and acquiring existing data for the Chesapeake Bay Program Data Center. The following sections describe the progress that NOAA has made in addressing each area.

Fishery Resource Assessments and Statistics

The NOAA Estuarine Programs Office and the NOAA National Marine Fisheries Service (NMFS) established a Stock Assessment Committee for the Chesapeake Bay. The Committee membership, which includes representatives from the States of Maryland and Virginia, the District of Columbia, academic institutions, and other Federal agencies, is charged with the responsibility of developing a cooperative program for the Bay-wide assessment of fishery resources. These activities consist of a number of integrated efforts: 1) studies which will improve the knowledge of important Bay stocks and improve techniques for conducting stock assessments, 2) working groups which will evaluate fisheries data bases and statistics, 3) studies which will partition the effects of fishing mortality, natural mortality, and contaminants, and 4) an annual report on the status of the stocks and an annual report describing the Committee's activities and accomplishments.

During the first year, the Committee has concentrated efforts on addressing activities 1 and 2 and published its first annual report. To improve the knowledge of Bay stocks, studies were funded to document the abundance of white and yellow perch, blue crab, shad, and river herring. The first field studies are being completed now. Efforts to intercalibrate and refine juvenile striped bass estimates were also funded and a state-of-the-art stock identification laboratory was established at the Virginia Institute of Marine Science. This laboratory will provide the technology to identify the various spawning stocks of species such as striped bass and therefore provide a means to help assess which of these stocks are increasing or declining. Both support the goal of improving techniques for conducting stock assessments. In FY86, studies documenting abundance of key Bay fisheries will continue. The effects of climate fluctuations on stock size will also be examined.

The Committee formed three working groups to improve fisheries statistics and therefore the ability to predict fishery abundance. The Data Base Identification Working Group is charged with identifying and interpreting time series data on parameters such as water temperature, flow discharge, climate variables, and nutrients. During FY86, the Committee will use innovative methods to conduct trial stock assessments on white perch, oysters, and blue crab taking into account the above-mentioned time series data bases.

These assessments will characterize the current abundance of these resources including their stock structure, life histories, and recruitment indices in selected tributaries of the Bay. The Data Base Coordination Working Group ensures that all data collected as part of the program is available for retrieval and analysis on the Chesapeake Bay Program Computer Center (CBP-CC) computer. To accomplish this goal, the Coordination group is working with the CBP-CC to establish a plan that defines biological data formats. For FY86, the group will establish mechanisms to transfer routinely collected fisheries catch and effort data as well as recruitment data to CBP-CC annually. Finally, the Status of Stock Knowledge Working Group is assembling the kinds of information available to assess important finfish and shellfish stocks and is evaluating the quality of this information. During this next year, the working group will provide a report to the Committee on the status of stocks in the Bay.

Low Dissolved Oxygen Studies

Low oxygen levels in the water kill many marine and estuarine organisms and in addition alter their migratory patterns and behavioral responses. Information, therefore, is needed on the causes and extent of low oxygen levels in waters and effects of these conditions on Bay resources. During FY85, the Maryland and Virginia Sea Grant programs were funded to discern the processes governing low dissolved oxygen in the Chesapeake Bay. The studies were designed to determine the factors that lead to low oxygen levels and the physical forces that govern the distribution of these poorly-oxygenated waters in the Bay.

Factors being studied include the contributions to low dissolved oxygen from decaying plants and animals that inhabit the Chesapeake and the contribution of sulfur or other chemicals to this problem. Sea Grant is also analyzing historical data regarding the extent of hypoxia in the Bay's waters.

Preliminary results of these studies have documented the variability of the low dissolved oxygen conditions. In 1985, anoxic conditions in the Bay were mild compared to the severe conditions of 1984 and 1983. Sea Grant's studies demonstrated that spring streamflow reached record high levels in 1984 and contributed to isolation of bottom water. In 1985, spring streamflow was 40 percent below average with similar biological factors in both years. The Chesapeake, therefore, remains vulnerable to widespread anoxia, particularly in years having strong spring runoff.

For FY86, Sea Grant will continue to address the processes governing low oxygen. It will continue efforts to examine the effects that low oxygen levels have on oysters which were begun in FY85. In FY86, Sea Grant will begin to examine the impact of chronic low oxygen levels on blue crabs and soft clams. These studies will assess the relation between poorly-oxygenated water and the activity, survival, and predator-prey interactions for both crabs and clams.

Identification and Acquisition of Data

NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) is making significant strides in accomplishing the goal to identify and acquire existing data for the CBP-CC. First, NESDIS funded the Maryland and Virginia Sea Grant programs to assist CBP-CC in documenting the data currently in the computer. The format chosen to describe these data sets was that of NOAA's National Environmental Data Referral Service (NEDRES), which is a component of the Assessment and Information Services Center. NEDRES, a computer catalog of environmental information, describes and quantifies data sets by type, source, and location. NEDRES was deemed particularly useful because of its accessibility to the public. As a result of this effort, most files at CBP-CC are now described in NEDRES. Second, an effort was made to identify all data sets not included in the CBP-CC computer. A list of these sets is being made available to user groups so that those of highest priority can be identified. These will then be converted to the CBP-CC format.

During FY86, NESDIS will continue to support the effort to identify and convert data sets to the appropriate format. In addition, NESDIS has already established a mechanism to access data held and collected by NOAA that is presently unavailable in the Chesapeake Bay computer. NESDIS will also coordinate the development of a user-friendly coastal information system. The system will be housed at CBP-CC and will provide information on dredging, dumping, critical habitats and numerous other parameters on a site-specific or use-specific basis.

NOAA's ONGOING CHESAPEAKE BAY ACTIVITIES

NOAA's ongoing programs provide information to help characterize the Bay and its living resources. These programs also include research to help answer questions about the Bay and provide expertise and grants to help manage the Bay's coastal zone and fishery resources.

NOAA publishes a number of documents which help describe the estuary and its resources. NOAA's Ocean Assessment Division is conducting several comprehensive interdisciplinary assessments of multiple resource uses which include information on the Chesapeake Bay. The National Estuarine Inventory Data Atlas contains data on the Chesapeake's dimensions, drainage area, stratification classification, flow rates and tides. A second volume of the Atlas will present information for up to 25 categories of land use for the related estuarine drainage areas.

In addition, pollutant discharge estimates have been made for the Chesapeake for nine source categories and nine categories of pollutants and are contained in the National Coastal Pollutant Discharge Inventory. An Economic Survey of Outdoor Marine Recreation in the USA will provide information on the distribution and characteristics of publicly provided marine recreation activities including those within the Chesapeake Bay. Results of the Survey will help identify and assess resource use conflicts.

In cooperation with the Food and Drug Administration, NOAA produced the 1985 National Shellfish Register of Classified Estuarine Waters. It classifies, according to State, shellfish growing waters and includes information on the Chesapeake. A National Coastal Wetlands Data Base is being developed by NOAA which will include information on the distribution of coastal and estuarine wetlands in estuaries such as the Chesapeake Bay. These data efforts will be incorporated into the National Estuarine Inventory. In addition, NOAA publishes a special environmental data source handbook for the Chesapeake Bay area, and its Assessment and Information Services Center until recently, published a marine environmental assessment report which describes the impact of marine climatic events on fisheries, recreation, and transportation. This latter report has been given over to the Chesapeake Research Consortium for publication and dissemination to the Bay-wide community.

In response to needs of industry and business associated with the Chesapeake, NOAA's Physical Oceanography Division is providing improved data and information on tides for navigational safety. Four tide measurement stations are being added to supplement the existing twelve stations. Two of the four are installed and are operational--one at the Chesapeake Bay Bridge Tunnel and the other at Tolchester Beach. The third and fourth will be installed at Windmill Point and Town Point, respectively. These stations enable pilots to call their home base, by computer with NOAA-developed software, to query the tide measurement stations for real-time data on water level conditions. In addition to improving safety, real-time data will allow pilots to use shorter routes for entering Baltimore Harbor, reduce fuel costs and overtime pay, and improve productivity.

Through its National Status and Trends Program, NOAA's Ocean Assessments Division is quantifying the current status and long-term trends of key contaminant concentrations in sediments and biota for coastal and estuarine environments. Under the Benthic Surveillance component of the Program, measurements of 43 toxic chemicals are made for both surface sediments and bottom fish. The Mussel Watch component of the Program involves analysis of bivalves and nearby sediments for the same toxic chemicals. There are three Benthic Surveillance sites and six Mussel Watch sites located in Chesapeake Bay. Preliminary results show that concentrations of seven polynuclear aromatic hydrocarbons in the Bay sediments are among the highest compared to six major estuaries sampled nationwide. For polychlorinated biphenyls (PCBs), however, values in Bay sediments are average when compared to these six estuaries.

To address other questions about the Bay, NOAA through its laboratories and Sea Grant institutions, conducts research on the Bay. NOAA's Assessment and Information Services Center is studying larval transport of economically important species such as the blue crab, using a numerical model of the Chesapeake Bay and adjacent shelf waters. This model is helping define the mechanisms which regulate the recruitment of larvae in the Bay.

NOAA's research also includes work on fish and shellfish diseases. Current research includes an investigation of several diseases afflicting Chesapeake Bay clams and oysters. Scientists have identified that one disease, blood sarcoma, is causing extensive mortalities in several populations of Chesapeake Bay soft clams. This research is being expanded to identify the causes of this disease. Technologies to diagnose diseases in Chesapeake Bay oysters are being developed. As a result of this expertise, NOAA's scientists serve on numerous advisory boards to State and academic institutions on this topic. NOAA also collaborates with the States of Maryland and Virginia to gather fisheries statistics and habitat-related data. NOAA also supports research on Chesapeake fisheries such as blue crab, oyster, hard clam, and menhaden.

To help manage the Bay's coastal zone, NOAA has provided grants and technical expertise to the States. Through its coastal zone management and interstate grant programs, NOAA has sponsored numerous activities to improve the quality of the Bay. Among others, these include: the long-term support of local government staff to review development proposals and assure their consistency with State environmental laws, preparation and implementation of soil conservation, soil erosion and watershed management plans, surveys of the state of submerged aquatic vegetation and support of experimental revegetation efforts, identification of sites for the proper disposal of dredged material, and implementation of a non-tidal wetlands program. In addition, NOAA has established a National Estuarine Research Reserve in the Chesapeake, a component of which is located at Monie Bay. Research conducted on this Reserve includes an examination of the impacts of man-made and natural ponds on sources such as water quality, vegetation, and fisheries in the Bay.

To help manage the Bay's fisheries, NMFS maintains an active habitat conservation program. Over the last 15 years, program staff have evaluated thousands of Federal permit and license applications and recommended mitigation strategies to minimize impacts to living resources and their habitats. In 1985, conservation efforts by the Agency encouraged the development of a Baltimore Harbor enhancement plan. The plan, which identifies sites for habitat preservation, enhancement, and mitigation, is now being implemented. Currently, the NMFS Northeast Region staff is working with the U.S. Fish and Wildlife Service and the States of Maryland and Virginia, and the Army Corps of Engineers to identify opportunities to restore and create fisheries habitats on the Bay.

In an effort to improve safety on the Bay, NOAA's National Weather Service provides weather warnings and forecasts from offices in Baltimore, Norfolk, and Washington. This service includes warnings of high winds and waves as well as other storm conditions that can affect the safety of people who work, play and live in the Chesapeake Bay area. Marine Automatic Weather Stations provide hourly weather observations from Thomas Point and the Chesapeake light. Dissemination of weather warnings and forecasts are made from four NOAA Weather Radio Stations and three flag display locations extending from Baltimore and Norfolk. The National Weather Service also provides, from the River Forecast Center in Harrisburg, forecasts of all the river flows into the Bay. The data used in the River Flow forecasts are available through a telephone dial-up on a near continuous basis.

We manage jointly with the U.S. Fish and Wildlife Service the emergency striped bass study. We also provide technical assistance to the Mid-Atlantic Fishery Management Council and other fishery commissions involved with the Chesapeake Bay, and we assist these organizations in developing their fishery management plans.

In summary, these programs assist us in addressing the factors that affect the living resources of the Bay. Figure 1 identifies these factors---pollution, habitat, fishing, and natural variability.

CONGRESSIONAL QUESTIONS

Your letter also requested that we address eight issues.

1. The authorization for the Chesapeake Bay Program expires in 1988, but the restoration effort will take years. What do you see as the Federal role in the Bay restoration effort beyond 1988? Do you see a need for a Bay reauthorization bill beyond 1988, and if so, in what form?

A Federal role in the Chesapeake Bay beyond 1988, should be to assist the States in monitoring the status of the Bay, managing its resources and implementing necessary regulations. With regard to monitoring, continuing efforts to document the trends of contaminants in fish and the bottom sediments will provide data to assess whether conditions are improving and would help identify which contaminants require greater controls. Monitoring of living resources would document abundance and trends as affected by the restoration effort.

NOAA recognizes that fisheries management within the Bay is predominantly a responsibility of the States. However, since NOAA is responsible for managing stocks throughout their range, NOAA works cooperatively with the States and other Federal agencies to insure that migratory species are properly managed. To maintain and enhance the Bay's fishery resources, a healthy habitat is required. To meet this objective, the responsible State and Federal agencies will need to develop more stringent measures to ensure that pollution sources are controlled and critical habitats are protected and restored. NOAA will support this objective through its permit review mechanisms as well as through its coastal and fisheries grants programs.

In addition, NOAA will continue to cooperate in the restoration of the Bay's resources by providing assistance wherever we have the expertise and capabilities consistent with our mandates. We will examine our ongoing programs and identify opportunities within these programs to support this effort. In fact, we have already begun this process of identifying where our activities can be modified to meet both our mandates and the goals of the Bay program. For example, we recently modified our procedures to require grant proposals from Virginia, Maryland and Pennsylvania be submitted through the Planning Subcommittee of the Chesapeake Bay Program. This change in procedure should ensure better coordination of our programs.

In conclusion, the restoration of the Bay's resources will require long-term commitment beyond 1988 by all participants.

2. Regardless of whether or not there is a reauthorization bill, how do you plan to integrate your program into Phase II of the implementation stage? What Federal funding and program resources will you need to effectively accomplish your objectives in Phase II?

Figure 2 identifies how our Chesapeake Bay activities support the Phase II process. As we mentioned in the previous question, we are examining our ongoing activities in the Bay to see how NOAA can provide further assistance to the Bay program within the context of our statutory responsibilities and funding. The following discussion briefly describes how some of these activities support Phase II.

One of the components of the Phase II process is to establish water quality and habitat criteria (step 2). At present, only water quality criteria exist. NOAA is exploring the feasibility of developing habitat requirements to restore, protect, and enhance the living resources. We have sponsored meetings with States and other Federal agencies to begin to define the areas where we can provide cooperative assistance and expertise. NMFS is preparing an analysis which will identify the information necessary to develop habitat criteria for species of concern. This feasibility analysis will include: 1) specific environmental issues and threats within the Chesapeake Bay, 2) a ranking of these threats in terms of importance to management and conservation responsibilities, 3) identification of probable linkages between threats and fisheries of interest, and 4) a description of general habitat needs for those species identified.

Phase II also involves the use of models to assist in the complex integration and prediction of the transport and distribution of dissolved and particulate materials, including pollutants, which enter the Bay system (step 4). NOAA is providing data to verify the circulation and the tidal transport components of this model. We are also providing staff to help develop the model.

Step V of Phase II requires the development and implementation of load reduction and habitat restoration technologies. NOAA, through its habitat conservation and research programs, is developing restoration, mitigation, and enhancement techniques. Some of these studies are not specific to the Chesapeake Bay, but the technologies are applicable. For example, the NMFS Beaufort Laboratory is pioneering methodologies to establish sea grass beds in various geographic areas. NOAA is conducting low dissolved oxygen studies including the effects of toxics on living marine resources, both individually and at the population level. In addition, we will continue to provide data support and improve our stock assessment capabilities.

We believe that the Phase II process provides the institutional framework necessary to ensure coordinated Federal, State, and local efforts. We will continue to use this coordination framework as the vehicle for examining our ongoing programs and identifying activities within these programs which also support Phase II goals.

3. Are there specific interim nutrient-reduction goals that can be implemented within the next year for point and nonpoint sources of pollution? If so, what should those goals be and how can they be implemented?

There is strong evidence that excessive nutrient loading has resulted in increased phytoplankton growth and bottom water hypoxia especially in central portions of the Bay. A two-dimensional water quality model scheduled for completion this winter will provide information to develop a general nutrient removal strategy with preliminary target load reductions by major basin. This model, however, is only as good as the information it utilizes. Through its activities, NOAA will provide information which will improve the predictive capability of the models. New data generated from the Chesapeake Bay circulation surveys will be fed into the model. In addition, the NOAA-funded dissolved oxygen projects will also enhance the model's predictive capabilities. We believe the study results will substantially assist the regulatory agencies in refining the interim strategy for nutrient-reduction goals.

4. What immediate, new initiatives could be undertaken to supplement the Phase II action plan?

Phase II has been designed to incorporate the various Federal, State, and local initiatives into a methodical and comprehensive environmental management approach for the Chesapeake Bay.

It is also designed to define as quantitatively as possible parameters, such as water quality and habitat, necessary to support a cleaner, more productive Bay. We believe that the Phase II initiatives are appropriate to address water quality issues and are therefore sufficient at this time. However, the development of habitat requirements is a complicated task. As mentioned in our answer to question 2, we are studying the feasibility of developing habitat criteria.

5. How will living resources and habitat protection concerns be incorporated into Phase II objectives? What research or initiatives on living resources and habitat protection is needed to meet Phase II objectives? What are the future funding needs in this respect?

Steps one, two, and three of Phase II will be the primary mechanisms to incorporate living resources and habitat protection into the restoration and protection program. We are addressing the issue particularly with respect to step two. In April, we hosted a joint Federal/State meeting to explore how habitat/living resource requirements might be developed for the Chesapeake Bay program. Based on this meeting, we believe the first step in incorporating habitat concerns must be for the agencies with the appropriate authorities to define water uses and to identify the living resources of highest priority for protection. The water uses must include those which would ensure the maintenance and enhancement of fishery resources.

At the present time, the majority of the research funds appropriated to NOAA for the Chesapeake Bay are aimed at addressing the status and trends of selected fishery stocks in the Bay. A primary goal of this effort is to develop tools to conduct better assessments and predictions of stock size. This effort will incorporate the effects of habitat degradation into the assessment of the fishery stocks.

6. How will you integrate into Phase II toxic or other harmful substance contamination of surface and ground waters of the Bay area?

While NOAA does not regulate pollution discharges in estuaries, we do conduct research and monitoring of key contaminant concentrations, water quality parameters, and biological indicators of the environmental quality in estuarine environments. NOAA's monitoring stations in the Chesapeake Bay provide data on the quality of the sediments and levels of contaminants in bottomfish populations at the sites. These specimens are analyzed for histopathological anomalies and chemical contamination. This program is combined with a companion monitoring effort, Mussel Watch, that samples the levels of major and trace contaminants in the tissues of shellfish. This information provides a basis to assess the severity of the toxic contamination problem and is crucial to the adoption of remedial programs through the Phase II process. Far more work however, is necessary to determine the effects of toxics on living resources.

7. With any complex management structure, as in the Bay cleanup program, there is always room for improvement. How can the present coordination and Executive Council management structure be refined?

The management structure of the Bay program is large and diverse, reflecting both the interest in, and the complexity of, the restoration effort. It may appear that the number of committees, subcommittees, and working groups slows effective action in adopting initiatives that significantly improve the quality of the Bay. However, the diverse structure ensures implementation of agreed-upon action. Therefore, we believe the current structure is appropriate for a clean-up effort. However, as water quality improves and the management of living resources becomes a higher priority, the responsibilities of the participating groups will need to shift.

8. From your perspective, how can the Federal Government encourage greater local government participation in the Bay cleanup process?

NOAA can provide information and technical expertise to local governments as they plan activities affecting the use and management of estuarine resources. Further, NOAA can assist local governments in establishing priorities and in their planning to assume a greater role in the Bay clean-up process. We believe that State and university commitments for the Chesapeake Bay are increasingly focusing these program resources at the local level.

Mr. Chairman, this concludes my prepared statement. I will be glad to answer any questions the Subcommittee may have.

RESTORATION OF LIVING RESOURCES

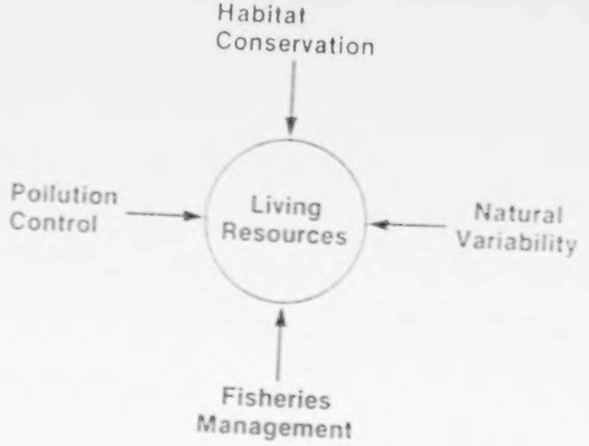
Habitat Conservation
Pollution Control
Living Resources
Natural Variability
Fisheries Management

FIGURE 1

PHASE II IMPLEMENTATION OF THE CHESAPEAKE BAY RESTORATION AND PROTECTION PROGRAM

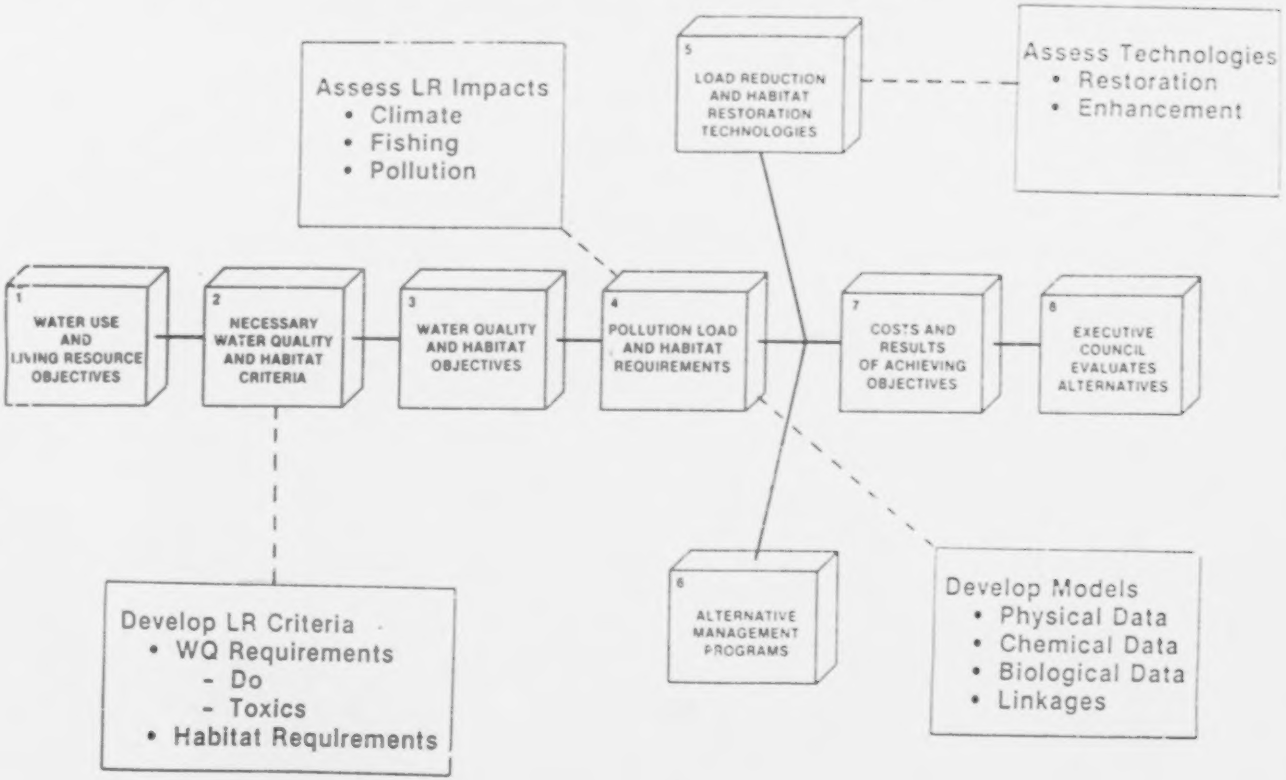
Assess LR Impacts
• Climate
• Fishing
• Pollution
5 LOAD REDUCTION AND HABITAT RESTORATION TECHNOLOGIES
Assess Technologies
• Restoration
• Enhancement
1 WATER USE AND LIVING RESOURCE OBJECTIVES
2 NECESSARY WATER QUALITY AND HABITAT CRITERIA
3 WATER QUALITY AND HABITAT OBJECTIVES
4 POLLUTION LOAD AND HABITAT REQUIREMENTS
7 COSTS AND RESULTS OF ACHIEVING OBJECTIVES
8 EXECUTIVE COUNCIL EVALUATES ALTERNATIVES
Develop LR Criteria
• WQ Requirements
- Do
- Toxics
• Habitat Requirements
6 ALTERNATIVE MANAGEMENT PROGRAMS
Develop Models
• Physical Data
• Chemical Data
• Biological Data
• Linkages

FIGURE 2

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington, D.C. 20230

THE DEPUTY ADMINISTRATOR

AUG 22 1986

Honorable Charles McC. Mathias
United States Senate
Washington D.C. 20510

Dear Senator Mathias:

Thank you for providing the National Oceanic and Atmospheric Administration (NOAA) with the opportunity to testify at the recent Chesapeake Bay hearings. Enclosed is our formal response to your follow-up questions of July 21, 1986.

If you, or your staff, require additional information regarding NOAA's role in the Chesapeake Bay Program, please do not hesitate to contact me.

Sincerely,

J. Curtis Mack, II

Enclosure

QUESTION

1. All programs need a criterion to judge whether or not the program has been a success. What criterion is EPA and NOAA using to determine at which particular point we can say the Bay clean-up program is a success, especially as it relates to living resources?

ANSWER: Ultimately, the success of the Chesapeake Bay Program will be judged by how well the goal of restoring the living resources is met. The Phase II process is designed to identify the objectives to meet this goal, and NOAA will provide assistance in developing the habitat requirements and water quality criteria. NOAA has formed an internal task force to identify the critical habitat issues for the Chesapeake Bay. Representatives from this task force are working closely with the EPA and States to coordinate efforts. Eventually specific joint criterion will be developed in this Phase II process. However, NOAA believes that finfish trends, shellfish health and grass abundance are important indicators.

The assessment of the trends in fisheries stocks can be a valid measurement of a success of clean-up and management efforts. The Chesapeake Bay Stock Assessment Committee (CBSAC) is developing techniques to partition the variation in stock abundance caused by fishing, pollution, and natural mortality. These techniques will help relate changes in the stocks to water quality and habitat improvements. Other biological indicators which NOAA views as important to judge the success of the program include shellfish and seagrasses. Shellfish are important indicators of water quality and, therefore, we routinely monitor them for contaminants in the Chesapeake as part of the National Status and Trends Program. Shellfish growing waters also are important indicators. In conjunction with the Food and Drug Administration, EPA, and the Fish and Wildlife Service, NOAA maps estuarine acres as "conditionally approved," restricted," "prohibited," or "nonshellfish/nonproductive." The relative numbers of acres in these categories changing through time, therefore, provides a good indication of the health of the estuary.

The loss of submerged aquatic vegetation and wetlands in the Bay has been linked to deteriorating environmental quality. The return of the Bay grasses would, therefore, be a good indicator of improved water quality, and effective restoration efforts. NOAA currently is evaluating the techniques for seeding and transplanting grasses and will be recommending appropriate procedures for restoring and enhancing these critical habitats.

QUESTION

2. I believe everyone would agree it is essential that we look for ways to ensure continuity of the Chesapeake Bay clean-up program. As an important first step, the EPA and the Governors have done a wonderful job in developing the Chesapeake Bay Restoration plan which established general goals for the clean-up effort. As a next step, Lee Thomas indicated that he would like to see the Executive Council forge a new Chesapeake Bay Agreement, perhaps using the Great Lakes Water Quality Agreement of 1978 as a model, which would establish specific Bay-wide strategies, water quality standards, and load limits for the Bay and its tributaries. How do you view Mr. Thomas' proposal and what do you believe to be an appropriate time-frame for the development of such a document?

ANSWER: The Great Lakes Water Quality Agreement is a very useful model for the development of water quality standards and load limits in the Chesapeake Bay. The first Great Lakes Agreement was signed by Canada and the United States in 1972. While the Agreement established a few specific water quality objectives, more importantly, it directed the United States and Canada to establish a joint effort to develop specific objectives for all the important water quality properties of the Great Lakes. This Agreement, therefore, provided the policy framework for the scientists to begin to establish specific chemical and biological objectives. These objectives were adopted when the Agreement was revised in 1978 and will continue to be revised as more scientific information becomes available.

We recommend that a similar process be used in developing a new Chesapeake Bay Agreement. First, decisionmakers must establish quantitative goals. For example, the decisionmakers may determine that the major goal of the agreement is to restore the biological productivity of the Bay to the 1950's. As outlined in the Phase II process, it will take time to establish a consensus on the uses and conditions desired for the Chesapeake and the associated quantitative goals. Once these goals are defined, scientists can then develop the specific water quality criteria or habitat requirements necessary to achieve these goals. Judging from the Great Lakes experience, the goals, objectives, and criteria will be continually revised as more information becomes available. Recognizing this, we believe that an initial agreement could be developed within a year with the understanding that it will be modified over time.

QUESTION

3. Tell us what might be done in the Chesapeake Bay with regard to the NOAA/COE Memorandum of Understanding for enhancement of fishery habitat?

ANSWER: NOAA, through the National Marine Fisheries Service (NMFS), is working with the Baltimore and Norfolk Districts to identify those projects where dredged materials may be used to enhance habitat for fisheries resources. Twenty-two Baltimore projects that are scheduled for maintenance in FY 87 and FY 88 have been reviewed and screened for habitat enhancement potential. One or more projects with the greatest potential will be selected as short-term demonstration projects for development of oyster, or possibly submerged aquatic vegetation habitat. NMFS has met with the COE on two occasions this year to establish the feasibility and criteria for such a project during FY 87. If successful, similar long-term projects may be designed. We are undertaking this effort within our existing budget.

QUESTION

4. Is enough and the right sort of research being accomplished in the Bay to improve our understanding for better management? What is missing or needed with regard to research efforts?

ANSWER: While a substantial amount of research is being carried out in the Bay, significant information gaps still exist. There remains a relatively poor understanding of the factors responsible for the decline of several major Chesapeake fisheries. These factors can be grouped under the general headings of pollution, physical loss of habitat, and overfishing. Their relative influence against the background of natural variability must be assessed in order to make well-informed management decisions for fisheries restoration.

Pollution: Much effort has been devoted to pollution research, particularly on eutrophication and low dissolved oxygen (DO), but even here significant gaps remain. The role of phosphorus in the upper portions of the Chesapeake and its tributaries has been recognized for some time and is the heart of many of the ongoing management efforts. However, less well understood are: (1) the role of nitrogen, especially in the downstream, saltier portions of the estuary; (2) the importance of nutrients that are sequestered in Bay sediments; (3) the functioning of the Bay food web; and (4) the coupling under various hydrographic regimes of primary producers, secondary producers, and microorganisms involved in nutrient recycling. Until such issues are more fully understood, management practices and projections of the time and resources required to achieve specific improvements in the summer DO situation will be imprecise. Fates of toxic organics and their effects on living marine resources is an important question which is receiving little research attention in the Chesapeake. The ultimate distribution of organic compounds usually are closely tied to the distribution of fine sediments. Our knowledge of the sources, sinks and dynamics of these substances needs to be better refined.

Habitat Loss: Extensive losses of fish habitat in the Chesapeake have occurred over the last several decades, but the effects of these losses on fish stocks is not known. In order to make management decisions regarding wetlands alteration, for example, research on the potential impacts of these alterations on fish stocks needs to be considered.

Overfishing: The role of environmental variability in determining levels of fish stocks also needs to be examined. The abundance of many commercially-important species is dominated naturally by infrequent strong year classes. Without understanding the influence of such factors as climate on these highly variable stocks, it is difficult to discern the longer-term impacts of changes in the Bay caused by fishing.

Bay research continues to be extensive and productive. Presently, a large fraction of the research is devoted to eutrophication and the influence of anthropogenic nutrient loading. In the future, more emphasis should be directed to the linkages between other human activities (toxic pollution, habitat loss and overfishing) and observed changes in fish stocks.

QUESTION

5. Are all of the problems with the Chesapeake Bay pollution problems? What are its problems in priority order? (people, their activities and wastes, climate, overfishing, struggle to optimize long-term quality of life and short-term quality of life and short-term socio-economic needs)

ANSWER: The Bay's primary problem is people: the burgeoning population in coastal areas and along drainage basins leading to the Bay. Increased population results in increased demand for shoreline construction, marina development, and other uses that conflict with fisheries and habitat objectives. Agricultural, suburban, and urban non-point runoff; municipal and industrial point-source pollution; and toxic contamination are related to the size of the regional population. NOAA is attempting to enter into a cooperative study with the University of Maryland to address agricultural non-point pollution problems. Information gained from this study would be used to assess the effectiveness of implementing various best management practices (Bay-wide) on enhancing fisheries resources. Another people-related problem is overfishing. The NOAA Chesapeake Bay Stock Assessment Committee is examining the effects of overfishing on key stocks.

Climate also affects the Bay's environment. For example, the current drought, a short-term climatic event, has affected salinities, particularly in the upper bay, which in turn have affected oyster spawning success and the distribution of oyster diseases. The subtle impacts of long-term climatic events, however, are not understood at this time. Unlike human activities, climatic events are beyond our control. However, knowledge of the impacts of climate provide information important to a comprehensive management strategy for many species.

QUESTION

6. Could economic development be used to enhance the clean-up of the Bay and the restoration of the living resources? Are there some pilot or test projects that ought to be explored? (COE, N-STP removal, BMP, etc.)

ANSWER: Economic development may be used to enhance the Bay clean-up. Those requesting loans, permits or licenses from government programs or agencies, could be required to fund the enhancement or restoration of a damaged habitat as a condition of approval. An example might be the stabilization of an eroding shoreline on public land.

QUESTION

7. Are there more efficient ways of accomplishing clean-up and restoration of living resources? Are there new technologies to bring to bear for understanding, monitoring, integrating and predicting, improving design of study, implementing? (remote sensing modelling, new stock identification techniques, new standards and criteria that would include things beyond water quality).

ANSWER: Some of the more important new technological developments of the last several years have come in the area of remote sensing. These advances may provide better pictures of environmental change in the Chesapeake. Satellite measurements of surface chlorophyll compare well with shipboard measurements and could provide Bay-wide "snapshots" of plankton blooms. Satellite and aircraft sensors can measure surface temperature, turbidity, and (to a limited extent) salinity. Airborne surveys of submerged aquatic vegetation (SAV) in the Bay are now operational and provide quantifiable indications of changes in SAV. It should be noted that research vessels are still required to monitor subsurface processes such as the development of bottom water anoxia.

The rapid development of computer technology has made feasible the use of three-dimensional computer models of Bay water quality. These models will permit more accurate determination of the effect of changes in pollutant discharges on nutrient and dissolved oxygen levels. Planning is nearing completion for application of such a model to the Bay. The results from a two-dimensional model will be available during this winter.

Determining the effects of changes in pollutant inputs on fish stocks is complicated by the wide geographical range of many important species. Striped bass from the Chesapeake travel hundreds of miles up and down the East Coast, intermingling with fish which spawned in other regions. New technology which analyzes eye lens proteins, enzymes and nucleic acids will help identify stocks originating in the Chesapeake. Laboratories, funded by NOAA through the Chesapeake Bay Stock Assessment Committee, are now being set up to pursue these techniques.

Nutrient inputs of both nitrogen and phosphorus have a significant impact on living resources in the Bay, and sewage treatment plant discharges are major sources of these inputs. Until recently, nutrient removal at these plants was not thought to be economically feasible. Advances in biological nutrient removal technology have brought this assumption under question, and nitrogen removal, in particular, is under consideration for plant upgradings in the Bay area.

Management of the Bay clean-up has relied heavily on water quality criteria, but it is well known that fish and shellfish have physical habitat requirements as well.

Analysis of the habitat requirements of important species in the Bay is underway with the objective of developing habitat criteria. These criteria will help assess the impact of proposed wetland modifications and guide in habitat restoration in the Bay.

QUESTION

8. What products has NOAA produced regarding the Chesapeake Bay and how have they been helpful? (Sea Grant seminars, atlases, inventories, data transfers, coastal zone management studies, weather forecasts, climate summaries, fish disease studies, permit reviews) What products are planned in the future and how will they be useful?

ANSWER: NOAA products for Chesapeake Bay include information reports, characterization, research efforts and the management of ocean and coastal resources.

Information

a. Marine Environmental Asssessment: quarterly and annual summaries of climate trends and its effect on fishing, boating, commercial shipping and other uses of the Bay.

b. National Estuarine Inventory:
National Estuarine Inventory Data Atlas - contains data on the Chesapeake's dimensions, drainage area, stratification classification, flow rates, and tides. A second volume of the Atlas will present information for up to 25 categories of land use for the related estuarine drainage areas.
National Coastal Pollutant Discharge Inventory - includes pollutant discharge estimates for the Chesapeake.
Economic Survey of Outdoor Marine Recreation in the USA - includes the distribution and characteristics of publicly provided marine recreation activities including those within the Chesapeake Bay.
1985 National Shellfish Register of Classified Estuarine Waters - classifies, according to the States, shellfish growing waters and includes information on the Chesapeake.
National Coastal Wetlands Data Base - includes information on the distribution of coastal and estuarine wetlands in estuaries such as the Chesapeake Bay.

c. Environmental Data Sources for the Chesapeake Bay: provides information on the location and characteristics of available data bases.

d. Estuary of the Month Seminar on Chesapeake Bay and Seminar on Ecological Changes Through Time: proceedings from two day-long seminars on the Chesapeake Bay with noted Bay researchers and managers.

Characterization and Research

a. Chesapeake Bay Stock Assessment Committee: published first annual report and completed its first year of studies and analytical tools development. CBSAC is transferring all data collected to the Chesapeake Bay Program Computer.

b. Status and Trends: NOAA monitors contaminants at three benthic surveillance and six mussel watch sites in the Bay as part of the National Status and Trends Program.

c. Disease Studies: NOAA studies shellfish and finfish pathogen life histories and immune mechanisms, including development and application of disease diagnostic systems, identification and characterization of disease agents, and microbial agents as indicators of environmental degradation. Qualitative and quantitative epidemiological studies of fish and shellfish diseases are undertaken and the results disseminated.

d. Navigation: NOAA maintains current nautical charts, and tides and current tables for the Chesapeake Bay.

e. Sea Grant Studies: See attachment 1 for a list of current Sea Grant-funded projects on the Chesapeake Bay.

Management

a. Living Resources: NOAA provides guidance and grants to the Atlantic States Marine Fisheries Commission and the Mid-Atlantic Fisheries Management Council for important Chesapeake Bay species such as river herring, shad, bluefish, and striped bass. These funds are utilized to develop the information required to manage these important species. In regard to endangered species, NOAA funded the Virginia Institute of Marine Science to investigate the causes of Sea Turtle mortality in the Chesapeake Bay. This information will be used to develop a plan for protecting these species.

b. Habitat Resources: NOAA/NMFS was a member of the State/Federal task force that developed the Baltimore Harbor Enhancement Plan. The Plan provides guidelines for development within Baltimore Harbor. The Plan also provides designated sites where compensation for unavoidable habitat losses can be constructed. NOAA/NMFS also is working cooperatively with the State of Maryland and the Commonwealth of Virginia to develop artificial reef programs. These programs will be used to enhance fishery habitat. Finally, NOAA/NMFS is involved in the U.S. Army Corps of Engineers Section 10/404 Permit Review Program.

Currently, approximately 600 permit applications are processed annually by the Corps and reviewed by NMFS. Projects range from small-scale recreational endeavors to large-scale ventures for revitalizing urban waterfronts. NOAA/NMFS provides advice on the effects of these proposed permits on living marine/estuarine resources and makes recommendations aimed at conserving and enhancing habitat.

c. Coastal Resources: The Commonwealth of Virginia submitted its final environmental impact statement on its coastal resources management program to NOAA. With the help of NOAA funds, the State of Maryland established the Critical Areas Commission to establish guidelines to implement a land use program within 1000 feet of the Chesapeake Bay. NOAA also has helped establish and fund the Monie Bay National Estuarine Research Reserve. The above products and activities described will be instrumental in developing appropriate management strategies for the Chesapeake Bay. NOAA is also developing an internal agency-wide estuarine plan that will establish comprehensive goals and objectives for the agency. This plan will further focus and align NOAA's diverse estuarine-related programs and should improve NOAA's effectiveness in the Chesapeake.

QUESTION

9. The EPA Chesapeake Bay Program is based on the premise that improved water quality will bring back the Bay's once prolific fish species, such as the striped bass. What specific joint actions are NOAA and EPA taking to ensure that, once the water quality is improved, the fish will come back?

ANSWER: NOAA and EPA Region II work together on various habitat issues in Chesapeake Bay. For example, we jointly review and comment on Section 10/404 proposals, develop impact assessments and recommendations for remedial action on Superfund sites, and evaluate other activities that affect living marine resources and habitats. These efforts serve to conserve/enhance habitat necessary for production of fishery resources. We are concerned, however, over the trend toward issuing permits for the filling and altering of important wetlands for non-water dependent activities when the applicant offers compensation. We believe this is an area that requires close attention.

In addition to our permit review responsibilities, NOAA also serves on various task forces and work groups (208 Water Quality Program Advisory Group, Maryland SAV Technical Committee, Coastal Resource Advisory Committee, Baltimore Harbor Enhancement Task Force) whose objectives are to enhance living aquatic resources.

While NOAA cannot ensure that fishery resources will return once the water quality has improved, previous experience (Potomac River, Lake Erie) has shown that when environmental perturbations and overfishing are eliminated, fish resources respond positively. In addition, hatchery and aquaculture techniques are available at the state and private sector levels and could be used to augment natural Bay stocks. To help ensure that the abundance of species (such as striped bass) increase in the Bay, NOAA and the Fish and Wildlife Service are identifying the extent of the water quality problem and the impact of fishing efforts. For example, in the Emergency Striped Bass Study, we noted that low pH, in combination with aluminum, led to larval mortality in certain portions of the Bay. In addition, NOAA identified that overfishing was severely limiting the recovery of striped bass. Identification of this problem led the Atlantic States Marine Fisheries Commission (ASMFC) to develop stringent management measures. We believe these measures should improve the stocks considerably. NOAA will continue to work with the ASMFC to ensure that fishery management measures support the striped bass and other important fishery populations with respect to the habitat/water quality problems identified in the Emergency Striped Bass Study. Other Federal and state agencies with the appropriate regulatory authority should take remedial action.

QUESTION

10. How do you ensure that Bay objectives are integrated within your agency? What mechanisms are used to assure that Bay goals are considered when making program budget decisions affecting environmental problems on the Bay?

ANSWER: The NOAA Estuarine Programs Office is responsible for coordinating NOAA's programs in the estuaries. To meet this goal, the Office is developing a plan for the agency. This plan will benefit activities in all the estuaries, including the Chesapeake Bay. In addition, the Office coordinates use of the Congressional appropriation to NOAA for the Chesapeake Bay. A study plan identifies the research priorities and provides guidance to each of the NOAA components participating in the effort.

NOAA assists the States in coordinating their efforts through the coastal zone planning process. For example, the State of Maryland has agreed to submit all proposals to the Planning Committee of the Chesapeake Bay for their review prior to submitting them to NOAA. NOAA has worked closely with the Commonwealth of Virginia to develop the Final Environmental Impact Statement for the Coastal Zone Management Plan which will address lands adjacent to the Chesapeake Bay.

QUESTION

11. The emphasis in the NOAA program has been on stock assessment, in terms of individual species. How does stock assessment relate to specific measures to restore the Bay fishery? Have you given any thought to approaching the matter from a habitat perspective since species may compete with one another? How have you considered the SAV community?

ANSWER: The Chesapeake Bay Stock Assessment Committee (CBSAC) is charged with partitioning the variation in stock abundance caused by fishing, pollution, and natural mortality. To accomplish this, CBSAC is developing the analytical and statistical tools to conduct stock assessments on Bay species incorporating ecosystem and habitat variables. These variables include air and water temperature, flow discharge, climate, nutrients, dissolved oxygen, contaminants, physical habitat, and trophic interactions. The task entails gathering and analyzing historical data bases, supplementing these data bases with additional studies, where necessary, and developing and applying innovative statistical tools to incorporate the broad set of variables. The necessity to incorporate so many variables led CBSAC to limit the first round of time series analyses to stocks which spend their entire life cycle in the Chesapeake. Accordingly, CBSAC has chosen the white perch, blue crab, and oyster as the first candidates for a comprehensive stock assessment. Significant progress on the white perch stock assessment has been made. The results of this effort should begin to demonstrate how habitat variables, including contaminants, affect stocks.

QUESTION

12. Furthermore, when will research on toxic impacts on fisheries and their habitats be given a higher priority in the allocation of research grants?

ANSWER: NOAA plans to continue its efforts to assess the effects of toxics on fish and their habitats. First, we hope to complete our major studies in dissolved oxygen next year and begin to refocus those efforts on the problem of toxics in the Chesapeake Bay. Second, we are planning a series of small workshops to be held this fall/winter with NOAA scientists and university researchers to discuss joint efforts to develop better predictive tools to assess the fate and effects of toxic compounds. While such research is not specific to the Chesapeake, these predictive tools will be applicable to the Bay's problems.

QUESTION

13. NOAA has recently completed a stock assessment program of several commercially valuable fish in the Bay. In light of this new research, would you say the bay is recovering? What are the prospects for the future?

ANSWER: CBSAC has completed its first year of data collection and has begun to analyze this information. Much of the research funded this year focuses on gaps identified by the Committee's various data working groups. The States, therefore, collect information on species such as blue crab, white perch, yellow perch, and sea trout where historical data bases are weak. Data from these studies will establish the first good data base from which trends can be described. To identify trends, however, more than a single year's data are necessary.

Initial research results have yielded results which will help develop a comprehensive management program for certain Bay species. For example, CBSAC studies based on this model revealed that the wind regime on the continental shelf is a critical factor in predicting whether recruitment of croaker will be strong. CBSAC will apply this model to other species such as flounder.

ATTACHMENT 1

SEA GRANT-FUNDED PROJECTS ON THE CHESAPEAKE BAY

1985 MARYLAND AND VIRGINIA SEA GRANT PROJECTS

FUNDED BY NOAA CHESAPEAKE BAY APPROPRIATIONS

R.B. Jonas (VA)
Chesapeake Bay Dissolved Oxygen Dynamics: Roles of Phytoplankton and Microheterotrophs

W.M. Kemp
W.R. Boynton (MD)
Relative Roles of Benthic vs. Pelagic Oxygen-Consuming Processes in Establishing and Maintaining Anoxia in Chesapeake Bay

H.W. Ducklow (MD)
The Role of Heterotrophic Bacteria in Generating and Maintaining Anoxia in Chesapeake Bay

L.W. Harding, Jr.
K.G. Sellner (MD)
Implications of Microzooplankton Grazing on Carbon Flux and Anoxia in Chesapeake Bay

M.R. Roman (MD)
Physical and Biological Processes Regulating Anoxia in Chesapeake Bay: Zooplankton Distributions, Grazing and Respiration

J.H. Tuttle (MD)
Contribution of Sulfur Cycling to Anoxia in Chesapeake Bay

T. Malone (MD)
Ship-Time Support and Coordination

J.C. Zieman (VA)
Sources of Biochemical Oxygen Demand in the Chesapeake Bay: The Role of Macrophyte Detritus and Decomposition Processes

L.W. Haas (VA)
Hypoxia in Virginia's Saline Waters: A Review and Analysis of Historic Data

R. Mann (VA)
Influence of Low Oxygen Tensions on Larvae and Post Settlement Stages of the Oyster, *Crassostrea virginica*

R.N. Jarman (MD)
Program Workshop and Report

1986 MARYLAND AND VIRGINIA SEA GRANT PROJECTS
FUNDED BY NOAA CHESAPEAKE BAY APPROPRIATIONS

Projects funded in 1986 include continuation of 1985 process-oriented investigations, as well as continued work on effects of low dissolved oxygen on oysters (see previous page). In addition, Sea Grant researchers will broaden their investigations on the effects of low dissolved oxygen on living marine resources. In calendar year 1987 they will begin their studies with the blue crab.

MARYLAND SEA GRANT PROJECTS
1986-1987

RESEARCH

1. FISHERIES RESOURCES

Reproduction and Recruitment

W.F. Van Heukelem
* On-shore Dispersal of Post-larval Blue Crabs: The Mechanistic Basis of Megalopa Recruitment to the Estuary

V.S. Kennedy/W.F. Van Heukelem
* Experimental Investigations on the Behavioral Basis of Oyster Retention and Recruitment in Estuaries

D.B. Bonar
Analysis of Early Postmetamorphic Mortality in Oysters and Enhancement of Spat Survivability
Project continuing from 1985

Population Dynamics

R.M. Harrell/E.D. Houde
+ Striped Bass and Hybrid Striped Bass Larval/Juvenile Nutrition and Energetics

E.D. Houde/E.J. Chesney
Population Biology of Bay Anchovy in Mid-Chesapeake Bay

R.W. Chapman
Mitochondrial DNA Analyses of Year Class Variation in Chesapeake Bay Populations of Striped Bass

Direct Utilization

F.W. Wheaton
+ Biological Filter Design for Crab Shedding and Aquaculture

D.A. Powers/F.C. Huang
* The Use of Protein Chemistry and Genetic Engineering to Manipulate the Metallothionein Genes in Striped Bass and White Perch

D.A. Powers/G. Scangos/L. DiMichele
* Genetic Engineering of Fish

A.J. Fedler
An Analysis of the Effects of the Chesapeake Bay Sportfishing License on Fishing Participation in Maryland

2. SEAFOOD TECHNOLOGY

T. Chai
Recovery and Characterization of Byproducts from Oyster Processing Wastes for Human Consumption

3. ENVIRONMENTAL QUALITY

T. Malone/J. Tuttle/R.B. Jonas
* Role of Heterotrophic Micro-ogranisms and Phytoplankton in Seasonal Oxygen Depletion of Chesapeake Bay

C.F. D'Elia
Water Column Phosphorus Dynamics in the Patuxent River, Maryland

K.G. Sellner
Effects of Suspended Sediments on Carbon Flow from Bacteria and Phytoplankton to Planktonic Herbivores in Chesapeake Bay

W.M. Kemp/W.R. Boynton
Relative Roles of Benthic vs. Pelagic Oxygen-Consuming Processes in Establishing and Maintaining Anoxia in Chesapeake Bay

+ Project beginning January 1987

* Project continuing from 1985

MARYLAND SEA GRANT PROJECTS

1984-1985

SEARCH

1. FISHERIES RESOURCES

Oysters

R. I. E. Newell
T. W. Jones
* Temporal and Spatial Variations in Biochemical Composition of Natural Food of Crassostrea virginica and Their Effect on Oyster Fecundity and Recruitment

L. W. Harding, Jr.
* The Nutrition of Chesapeake Bay Oysters (Crassostrea virginica Gmelin) and Its Relationship to Dynamic Patterns of Carbon Assimilation into Distinct Classes of Cellular Constituents in Phytoplankton

R. M. Weiner
D. B. Bonar
• Chemical Induction of Setting in Crassostrea virginica with Emphasis on Melanin-Producing Autochthonous Bacteria

V. S. Kennedy
W. F. Van Heukelem
• Experimental Investigations on the Behavioral Basis of Oyster Retention and Recruitment in Estuaries

Crabs

S. D. Sulkin
W. F. Van Heukelem
On-Shore Dispersal of Post-Larval Blue Crabs: The Mechanistic Basis of Megalopa Recruitment to the Estuary

Finfish

F. D. Martin
D. A. Wright/T. A. Smucker
• Identification of Striped Bass (Morone saxatilis) Stock Units within Chesapeake Bay Using Natural Tags. II. Fluorescent Marking and Elemental Composition of Otolith

R. W. Chapman
D. A. Powers
* Mitochondrial DNA and Sequential Electrophoretic Analyses of Striped Bass in the Chesapeake Bay

D. A. Powers
R. C. Huang
* The Use of Protein Chemistry and Genetic Engineering to Manipulate the Metallothionein Genes in Striped Bass and White Perch

D. A. Powers
G. Scangos/L. DiMichele
• Genetic Engineering of Fish

2. SEAFOOD TECHNOLOGY

T. Chai
* Oyster Pasteurization in Flexible Pouches and Safety Assessments

3. ENVIRONMENTAL QUALITY

J. C. Means
Studies of the Biogeochemistry of Selected Persistent Organic Contaminants

G. R. Helz
* Effects of Dechlorination on the Persistent By-Products of Chlorination

W. M. Kemp
R.R. Twilley/W.R. Boynton/J.C. Stevenson
* Denitrification and Related Processes in Estuarine Sediments: Controlling Factors and Implications for Management of Nutrient Wastes

J. Tuttle
T. Malone/R. B. Jonas
* Role of Heterotrophic Microorganisms and Phytoplankton in Seasonal Oxygen Depletion of Chesapeake Bay

R. R. Colwell
D. J. Grimes
Nonrecoverability of Fecal Coliforms and Effect on Coliform Indices for Public Health Safety

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* Project continuing from 1983
• Project beginning January, 1985

VIRGINIA SEA GRANT PROJECTS
1986

MARINE RESOURCES DEVELOPMENT- AQUACULTURE

Genetics of Geographical Effects on Growth Rates in the Hard Clam, *Mercenaria mercenaria*	S.L. Adamkewicz
Investigation of Acquired Immunity: Adaptive Response in the American Oyster (*Crassostrea virginica*)	F.L. Chu B.A. Weeks
Cryopreservation of Commercially Important Marine Bivalve Gametes (revised)	L.L. Ellis M. Castagna

MARINE RESOURCES DEVELOPMENT - FISHERIES AND OCEANOGRAPHY

Role and Value of Shallow Water Habitats for Megalopae and Early Crab Stages of the Blue Crab, *Callinectes sapidus*	R.J. Orth J. van Montfran
Biological Factors as Determinates of Blue Crab Recruitment	J.R. McConaugha
Stock Identification of Summer Flounder (*Paralichthys dentatus*) in the Southern Mid-Atlantic Bight: Tagging Studies	J.A. Musick A.D. Estes
Objective Characterization of the Relationship Between Seasonal Wind Regimes and the Recruitment of Croaker and Flounder	B.L. Norcross H. Austin P.J. Michaels
Evaluation of Containerized Relaying of Hard Clams	H.I. Kator M.W. Rhodes

Life Cycle Studies of the Oyster Pathogens *Haplosporidium costale* (SSO) and *Haplosporidium nelsoni* (MSX) Using Fluorescent Antibody Techniques	E.M. Burreson
Effects of Environmental Pollutants on the Cellular Immune Response of Fish	B.A. Weeks J.E. Warinner

MARINE ENVIRONMENTAL RESEARCH

The Use of Multiple Stable Isotopes to Delineate Coastal and Estuarine Seagrass-Based Food Webs	J.C. Zieman A.L. Mills S.A. Macko
Currents and Sediment Transport in a Groin Field	J.C. Ludwick
Antineoplastic Substances (Ovotoxins) from Ovaries of Marine Invertebrates	L.I. Rebhun C.C. Walker T.L. MacDonald
Resources of Fossil Shell and Stratigraphy Underlying the Central Portion of the Rappahannock River Estuary	C.H. Hobbs L.D. Wright

VIRGINIA SEA GRANT PROJECTS

1985

MARINE RESOURCES DEVELOPMENT- AQUACULTURE

Genetics of Geographical Effects on Growth Rates in the Hard Clam, *Mercenaria mercenaria*	S.L. Adamkewicz
Investigation of Acquired Immunity: Adaptive Response in the American Oyster (*Crassostrea virginica*)	F.L. Chu B.A. Weeks
Cryopreservation of Commercially Important Marine Bivalve Gametes	L.L. Ellis M. Castagna

MARINE RESOURCES DEVELOPMENT - FISHERIES AND OCEANOGRAPHY

Distribution and Recruitment of Blue Crab Larvae: A Physical Model	D.R. Johnson J.R. McConaugha
Vertical Position of Blue Crab Larvae as a Mechanism for Reinvasion of the Estuary	J.R. McConaugha
Role and Value of Shallow Water Habitats for Megalopae and Early Crab Stages of the Blue Crab, *Callinectes sapidus*	R.J.Orth J. van Montfran
Investigation of the Process of Self-Purification in Relayed Shellfish	H.I. Kator M.W. Rhodes
Evaluating Public Policy Options for Increasing Production of Market Oysters	O. Capps, Jr. C.W. Coale L.A. Shabman

Life Cycle Studies of the Oyster Pathogens *Minchinia costalis* (SSO) and *Minchinia nelsoni* (MSX) Using Fluorescent Antibody Techniques	E.M. Burreson

MARINE ENVIRONMENTAL RESEARCH

The Use of Multiple Stable Isotopes to Delineate Coastal and Estuarine Seagrass-Based Food Webs	J.C. Zieman A.L. Mills S.A. Macko
Nursery Value of Coastal Marshes Determined by Multivariate Comparison of Habitat Factors	W.E. Odum
Currents and Sediment Transport in a Groin Field	J.C. Ludwick

MARINE RESOURCES UTILIZATION

Development of Food Products from Menhaden *(Brevoortia tyrannus)*	G.J. Flick H. Dupuy R.L. Ory
Shelf-life Predictions for Finfish Based on Initial Product Composition and Microbiological Quality	D.R. Ward
Development of a Microcomputer Process Controller for the Pasteurized Blue Crab Meat Industry	G.J. Flick J.W. Keller F.M. Bailey J.W. Boling
Antineoplastic Substances (Ovotoxins) from Ovaries of Marine Invertebrates	L.I. Rebhun C.C. Walker T.L. MacDonald
Resources of Fossil Shell and Stratigraphy Underlying the Central Portion of the Rappahannock River Estuary	C.H. Hobbs

STATEMENT OF
ROBERT K. DAWSON
ASSISTANT SECRETARY OF THE ARMY
FOR CIVIL WORKS

It is my pleasure to appear before you today, Mr. Chairman, to report on the Army's role in restoring the environmental health of a true national treasure - the Chesapeake Bay.

You have asked a number of questions which are most appropriately answered by the Environmental Protection Agency. I will limit my statement to steps the Army is taking to aid in the restoration effort.

The Army Corps of Engineers has been involved in the Bay for more than 190 years. First, as the builder of fortifications vital to our young nation's defense. Later, as the promoter of vital navigation projects which opened the Chesapeake to intracoastal trade, with the port cities of Baltimore and Norfolk serving as gateways to world commerce. Currently, the Corps of Engineers operates 14 flood control reservoirs and numerous flood control projects across the vast drainage basin.

In 1967, Congress directed us to undertake the first comprehensive study of how the bay works. We expended over $30 million which included construction of a hydraulic model of the Bay. The model provided valuable information and answered many questions concerning the effects of deepening and enlarging the channels at Baltimore and Norfolk, use of the Potomac River as a source of water supply for Washington, impacts of refinery location and the fate of hazardous waste spills. From that study, today's scientists know the basic physical characteristics of the Bay's complex systems, and better understand the balance between the ocean's tides and the inflow of fresh water from its tributaries. This data is available for use by all agencies involved with the bay.

Through our participation on the Chesapeake Bay Program's Implementation Committee, the Corps has provided valuable resources, both financial and manpower to the Program. To help understand the crucial link between flourishing sub-aquatic vegetation beds and Bay water quality, we have contributed over $200,000 toward an interagency effort to map and identify the distribution of Bay grasses. Similarly, Corps of Engineers modeling experts from the Waterways Experiment Station in Vicksburg, Mississippi, have assisted the Research and Modeling Subcommittee with the development of a technical scope of work needed to create a three-dimensional water quality model of the Bay.

I am particularly pleased to report that on June 6, I, together with Governors Hughes, Baliles, and Deputy Mayor Downes, signed a ten year cost-sharing agreement to control the spread of hydrilla in the Potomac River. Since 1982, the area infested by the plant has increased from 10 acres, to 1900 acres at the end of 1985. The thick hydrilla mats which have impeded fish development, increased mosquito and other pests habitat, and interfered with heavy demands for commercial and recreational boating, have also begun to deny Washington area residents valuable recreational use of the Potomac. After a year of intensive field testing and laboratory experiments, the program will feature twice annual harvesting of hydrilla in select locations beginning in July 1986. The plan is to cut a 60-foot wide access channel from shoreside marinas to open waters. Over the next ten years, 290 acres of hydrilla will be affected and involve some 3400 commercial and recreational boat slips. The hydrilla program attempts to strike a balance between the public's demand for use of the Potomac and the environmental goals of a healthier river.

We are integrating the Chesapeake Bay Program's environmental goals into its regulatory operations. The Baltimore and Norfolk Districts are currently reviewing the possibility of amending our General Permits Program to incorporate regional conditions for greater environmental protection. To assure a more uniform approach to Bay permit review and to further educate the public to the sensitivity of the Bay ecology, we are considering modifications to strengthen resource protection in sensitive Bay regions. An immediate positive benefit of revisions to the General Permit program, will be the increased likelihood of identifying opportunities for coupling development demands with habitat and protection projects without creating undue delay in the review process or increasing the cost of future projects.

I am pleased to note that both Maryland and Virginia have recently signed landmark cost-sharing agreements to permit the improvements to Baltimore and Norfolk harbors to proceed when user fee legislation for navigation is enacted. During the process of planning these projects, numerous public meetings were held, as well as interagency meetings. These meetings provided opportunity for public input into the project formulation and preparation of the environmental impact studies. Because of the extensive knowledge the Army has gained from its Chesapeake Bay Study and its experiences upon the Bay, numerous environmental safeguards have been incorporated into the design and actual construction of these vital port improvement projects. To protect the aquatic environment near sensitive spawning grounds, specific dredging windows and special contractor procedures have been developed to keep environmental interference during construction at a minimum. In addition, increased local cost sharing policies which we have been pursuing have resulted in design changes which will substantially reduce the amount of dredging required while meeting the navigation needs of these ports. For example, modifications to the Norfolk project resulted in a reduction in channel dredging from 70 million cubic yards to 15 million cubic yards. Similarly, modifications at Baltimore resulted in a reduction from 66 million cubic yards to 52 million cubic yards.

Finally, the Corps is making reconnaissance phase studies addressing erosion control and drought management which may eventually aid local jurisdictions in controlling practices which degrade the Bay.

As this forum here today demonstrates, the Chesapeake Bay Program's approach to restoration and prevention of degradation is quickly becoming the model for similar estuarine clean-up campaigns across the country. The Army welcomes its role in the restoration of a national asset.

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, DC 20310-0103

September 4, 1986

Honorable Charles McC. Mathias, Jr.
Chairman
Subcommittee on Governmental Efficiency
  and the District of Columbia
Committee on Governmental Affairs
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

The attached contains replies to questions in your letter dated July 21, 1986, concerning the Chesapeake Bay Clean-up Program. Again, I appreciated the opportunity to present testimony at your hearing on June 24, 1986, and look forward to contributing Army resources and expertise to restoration of this national asset.

Sincerely,

for Steven Dola, Acting
Robert K. Dawson
Assistant Secretary of the Army
(Civil Works)

Attachment

Question: How do you view Mr. Thomas' proposal and what do you believe to be an appropriate time-frame for the development of such a document?

Response: The Great Lakes Water Quality Agreement of 1978 provides an excellent model to be followed in coordinating the local, state and Federal agencies activities within the Chesapeake Bay area. An agreement as proposed by Mr. Thomas would aid in identifying Bay-wide strategies, water quality standards, load limits and priorities. I believe a reasonable time frame in which to develop such a document would be from six to nine months, depending on the issues that are identified.

Question: The Corps has broad regulatory authority under Section 404 of CWA. What consideration is the Corps giving to revising its permit guidance system to better reflect the goals of Bay restoration?

Response: I believe we can support the goals of Bay restoration under existing guidance. The Baltimore and Norfolk Districts, which have regulatory responsibility for the Bay, have been coordinating closely to ensure that both the overall regulatory program and the individual permit decisions give full consideration to the goals of the Bay Clean-up Program.

Question: How do you ensure that Bay objectives are integrated in your agency's programs? What mechanisms are used to assure that Bay goals are considered when making program budget decisions affecting environmental problems on the Bay?

Response: Bay objectives are, of course, carefully weighed in relation to other worthy objectives, on a nationwide basis, when decisions are made concerning items recommended to be included in the President's Budget. Any sound economically justified project that fulfills a clear need and meets the new starts criteria will continue to be considered. I have made it a practice that I or a member of my staff be personally involved in any Civil Works funding decisions that affect the Chesapeake Bay.

Question: How does the Army integrate Bay program goals into decisions affecting both military installation environmental management plans and its civil works programs across the Bay region?

Response: The Army participates fully in Federal sector efforts to attain Bay program goals through the DOD-EPA joint resolution. Decisions affecting Bay area military installation environmental management must be made in conformity with the National Environmental Policy Act (NEPA), thereby assuring consideration of the effects of proposed actions on the Bay.

The Army integrates Bay program goals into decisions affecting military programs both at the installation level and at the Service level. For example, the installations are made aware of potential concerns and opportunities through State agencies and implement appropriate actions. At the Service level, water quality assessment studies of all of the Department of Defense installations in the Chesapeake Bay basin are presently being conducted by DOD with the assistance of Baltimore District and the Department of the Army. It is envisioned that this will lead both to an understanding of the relative impact of DOD facilities and to the efficient use of limited resources within the military program around the Bay.

For the Civil Works program, the participation by the Corps of Engineers with the Implementation Committee of the Chesapeake Bay Program insures that appropriate concerns are brought to the attention of the three Districts (Philadelphia, Baltimore, and Norfolk), the North Atlantic Division, the Chief of Engineers, and my office for response and appropriate action.

Question: How do you propose to protect eroding shores without introducing toxics through bulkheading and without eliminating important shallow water habitats? How have you integrated this concern into your permit program?

Response: Our regulatory program recognizes this problem -- that use of treated timbers as a structural alternative to aid in the control of erosion introduces another problem, namely chemical pollution. Certainly the use of rip-rap and gabions provides alternative, more traditional methods of controlling erosion and can simultaneously provide habitat for a multitude of sessile plants and animals, particularly in shallow water marine environments. Additionally, the consideration of natural stone revetments, off-shore breakwaters, low-crested sills and headland breakwaters offer promising alternatives to the more traditional approach. The Corps Waterways Experiment Station has been examining the effectiveness of marsh grass to anchor and stabilize eroding shorelines in low to medium wave energy conditions with encouraging results. Marsh grasses have been proven to retard or eliminate erosion in low wave energy climates. Although still experimental, considerable success has been obtained under conditions of moderate wave energies using specially planted marsh grasses or combinations of marsh vegetation and low-cost structures such as sand bags and/or tires. These vegetative solutions are less costly than their structural counterparts and have the added advantage of providing valuable habitats.

Until recently, the effects of creosoted and pressure-treated timber on the aquatic environment has generally been considered minor because of high dilution ratios. However, because of their own concerns and the concerns of other Federal agencies, Baltimore and Norfolk Districts' Regulatory Branches recently initiated a study on the effects of vertical walls in the nearshore zone. The study includes a program for sampling sediments for creosote, chromium and copper, the latter two found in pressure-treated lumber.

Question: Have you tried to use your permit data to monitor habitat trends in the Bay, perhaps via a Geographic Information System or similar method?

Response: The Baltimore District is utilizing permit cases as a source of data for monitoring habitat trends through a computerized system. It has learned, for example, that during the last three years, permits have authorized the loss of only five acres of wetlands while requiring either as mitigation or restoration, the creation of 80 acres of wetlands. With additional funds from the State of Maryland, the Environmental Protection Agency (EPA) and the Fish and Wildlife Service, both Baltimore and Norfolk Districts contracted in 1985 with the EPA Photo Interpretation Center to prepare maps of submerged aquatic vegetation (SAV) beds in the Bay. This year they have provided funds to the Bay committee to compare changes in SAV between 1985 and 1986.

Question: The population in the Bay's watershed is anticipated to reach 14.6 million people by the year 2000, posing a potentially overwhelming pollution burden on the Bay's living resources and water quality. What land use strategies should be instituted to deal with this reality?

Response: First and foremost, land use strategies are the responsibility of the local jurisdictions and the states. Planning for population growth is inherent to that responsibility. Army has no capability to address land use issues, therefore I have to defer to governors of the respective states on this question.

Question: What is the status of the proposed Dredge Disposal Study of the Bay?

Response: Disposal of material dredged from navigation channels has been a continuing problem in the Bay for many years. Few upland sites are available and overboard disposal is not always acceptable. Future dredging work depends on locating environmentally safe disposal sites. For these reasons, the Dredge Disposal Study is being considered by the Corps as a potential new start candidate for Fiscal Year 1988. In October 1985, I signed a cooperative agreement with Mr. Anthony Calio, the Administrator of NOAA to determine the practicability of establishing a nationwide habitat restoration and creation program. Under the auspices of this program the Corps, National Marine Fisheries Service, and the States of Maryland and Virginia have joined into a cooperative venture to evaluate the feasibility of using maintenance dredged material from Congressionally authorized navigation projects to establish suitable habitat for shellfish in the Chesapeake Bay.

TESTIMONY OF MR. FRANK DUNKLE, DIRECTOR, U.S. FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, BEFORE THE SENATE COMMITTEE ON GOVERNMENTAL AFFAIRS, SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY, RELATING TO THE FUTURE DIRECTION ON THE CHESAPEAKE BAY PROGRAM

JUNE 24, 1986

Mr. Chairman, I appreciate this opportunity to appear before you today to discuss the Fish and Wildlife Service's role in the Chesapeake Bay program.

The Service believes that the multi-agency effort involved in the program is of critical importance to improve water quality and to replenish the Bay's living resources, especially migratory birds, and anadromous fish, as well as its wetlands. The Service has a vital interest in this restoration program since it has five wildlife refuges, and one fish hatchery on or adjacent to the Bay. The restoration program is ambitious and will demand the continued dedication of all participants. The Service is committed to that effort and has made it part of the Department of the Interior's "Take Pride in America" initiative.

The Service officially became involved in the restoration program after signing a Memorandum of Understanding with the Environmental Protection Agency in 1984. The Memorandum identifies the Service's responsibilities and related capabilities for fish and wildlife resources. Prior to the Memorandum, the Service maintained a close relationship with the Environmental Protection Agency during the research phase of the Bay program and has long dealt with Bay problems concerning habitat protection, anadromous fish, and migratory waterfowl.

The Service has oriented its program to the critical issues identified by the Environmental Protection Agency: (1) nonpoint source pollution, (2) point source pollution, and (3) loss of submerged aquatic vegetation and declines in important fish and wildlife resources. Additionally, the Service is a partner with the States of Maryland and Virginia in a cooperative effort to restore striped bass. Public education concerning Bay resource problems and possible solutions is another major activity within our program.

In your invitational letter, you requested that the Service respond to eight specific questions regarding Phase II of the program and potential efforts beyond 1988. Responses to these questions generally are limited to the Service's role in the program.

1. The authorization for the Chesapeake Bay program expires in 1988, but the restoration effort will take years. What do you see as the Federal role in the Bay restoration effort beyond 1988? Do you see a need for a Bay re-authorization bill beyond 1988, and if so, in what form?

A good start on restoring Chesapeake Bay has been made, but few permanent improvements are likely to be realized without some level of Federal involvement beyond 1988. Certain Federal agencies serve as needed catalysts for restoration activities involving resource problems and issues that cross State and local jurisdictions.

The Service's involvement in this interagency effort stems from its shared responsibilities with other Federal agencies for the Bay's fish and wildlife resources. These responsibilities specifically involve endangered species, anadromous fishes, migratory birds, and their habitats. Although the Service fully recognizes State jurisdiction in the management of resident and commercial species, it can assist with a habitat or ecosystem-oriented approach to management of these resources. Opportunities also exist under the recently enacted Farm Bill to promote Bay restoration. Specifically, the Farm Bill contains conservation reserves, debt restructure, and swampbuster provisions that could have a significant effect on improving water quality throughout the Bay and increasing valuable Bay habitat.

By 1988, recommendations for effluent limitations will have been developed, related studies will have been completed, and recommendations for cleanup activities will be available. A continued Federal presence will be needed to monitor the implementation of the program and to coordinate interstate, local, and Federal interests. Fine tuning of the implementation stage will be possible once the results from monitoring trends in resources and improved water quality become available.

2. Regardless of whether or not there is a reauthorization bill, how do you plan to integrate your program into phase II of the implementation stage? What Federal funding and program resources will you need to effectively accomplish your objectives in phase II?

The Service's plan, relative to Phase II of the implementation stage of the Bay Restoration program, is to: (1) set numerical goals on species abundance and habitat needs, and (2) establish specific methods to achieve these goals. Habitat Evaluation Modeling Procedures and Cumulative Impact Assessment Practices developed by the Service can be used to evaluate major criteria for species and habitat pathways.

The striped bass cooperative recovery effort with Maryland and Virginia is another Service activity that will continue, assuming current funding levels, during Phase II of the program. This effort involves support for project coordination, temporary staff, and equipment necessary to expand work in broodstock capture, hatchery modifications for rearing of striped bass fingerlings, tagging, release and assessment.

3. Are there specific, interim, nutrient-reduction goals that can be implemented within the next year for point and nonpoint sources of pollution? If so, what should these goals be and how should they be implemented?

Yes, the Service believes there are goals that can be implemented. Without limits for nutrients and control of toxic substances, the Bay restoration program will not succeed. For example, reports by the Environmental Protection Agency reveal that total nitrogen levels above 1 milligram per liter indicate a stressed system, where algae blooms may be expected. We defer to the Environmental Protection Agency regarding appropriate steps to be taken under the National Pollutant Discharge Elimination System to address this issue.

Establishment of forest buffer strips along streamsides and shorelines has a beneficial effect on Bay resources. Buffer strips retard surface runoff and consume nutrients. The use of these strips should continue to be encouraged as an approved Best Management Practice in the agricultural community.

Federal agencies having influence over land use practices should continue to encourage State and local governments to reduce point source and nonpoint source pollution from urban, suburban, and agricultural areas.

4. What immediate, new initiative could be undertaken to supplement the phase II action plan?

Efforts should continue to further upgrade and retrofit sewage treatment plants in the Bay area. These facilities introduce significant loads of nutrients and toxic compounds that can be controlled. Watersheds with high resource value that experience heavy nutrient loads and need immediate implementation of Best Management Practices should be identified. The Service has already identified high-priority watersheds for fish and wildlife resources.

5. How will living resources and habitat protection concerns be incorporated into phase II objectives? What research or initiatives on living resources and habitat protection is needed to meet phase II objectives? What are the future funding needs in this respect?

The Service will be emphasizing fish and wildlife resources and habitat protection in Phase II of the program. The Service is prepared to establish criteria on species abundance and distribution that would indicate a "restored" Bay.
The Service also plans to identify habitat deficiencies for important species and to develop strategies for restoring habitats to correct these deficiencies.

Research should focus on the habitat requirements and tolerance to toxic substances of key species in the Bay and its tributaries. Results of this type of research could be applied to establishing guidelines for controlling and managing discharge of toxic substances into the Bay.

6. How will you integrate into phase II toxic or other harmful substance contamination of surface and groundwaters of the Bay?

The Service has an environmental contaminant assessment program that provides expertise regarding the impacts of toxic substances on Bay biota, and that emphasizes biomonitoring. Using both a survey of Superfund sites within the Chesapeake Bay watershed, and several National Pollutant Discharge Elimination System sites, the Service ascertains present toxicant concentrations for selected animals, sediment, and water samples. When these are abnormally high, the Service can then use bioassays and histopathology to correlate impacts with toxicants.

This biomonitoring approach is increasingly being used by the Environmental Protection Agency and some States to document harmful impacts of toxicants. The Service is working with other agencies in developing this segment of the Bay Program. The results will include documented cases that can be used for reviewing limits for point-source discharges.

7. With any complex management structure, as in the Bay cleanup program, there is always room for improvement. How can the present coordination and Executive Council management structure be refined?

The restoration and enhancement of living resources is a primary goal of the efforts in the Chesapeake Bay Program. The Service recommends that the efforts of the recently established task force for living resources provide an opportunity to achieve these goals.

8. From your perspective, how can the Federal government encourage greater local government participation in the Bay cleanup process?

The successful cleanup of the Chesapeake Bay depends on input from all levels of government, particularly local governments, and individual citizens. The Federal government can support local participation through: training and technical support, example, information, and cooperation.

The Service is currently providing training and technical expertise on wetlands and submerged aquatic vegetation to county governments in Maryland to assist in implementation of the legislation developed by the Critical Areas Commission. The Service provides assistance as requested on wetland issues to the Virginia Wetlands Board, and can also provide additional resource information and assistance on fish and wildlife resources to public and private groups and to individual citizens as requested.

Certain federal land management practices, including those conducted on National Wildlife Refuges, can serve as a model for States and local governments. Federal installations can often forge the way by adopting modern land conservation techniques. An example is the farming activity conducted at Blackwater National Wildlife Refuge. During the summer, in the middle of the crop season, the refuge aerially seeds its fields with grass so that after the crop is harvested, the land is left with a cover that minimizes erosion.

Publications and reports by Federal agencies can provide useful information for decisions and action at the local level. The Service has distributed fact sheets on particular species and issues to alert the public as to the causes of environmental problems and possible courses of action. Current fact sheets exist on canvasback, striped bass, black duck, American shad, submerged aquatic vegetation, and the role of the Service. The Service provides important information on habitats and species of concern in the Bay by summarizing existing information from a variety of sources. This information can then be used by the local governments to set courses of action appropriate to their jurisdictions.

The Service also is interacting with the Citizens Program for the Chesapeake Bay and the Chesapeake Bay Foundation to involve individual citizens in Bay restoration. The Service has started a citizen submerged aquatic vegetation program to verify the presence of grasses in the Bay. Approximately 500 volunteers are expected to participate.

Mr. Chairman, the Service is hopeful that these observations and recommendations will be useful to you as the Congress considers the future of the Bay program. With the concerted efforts of each of the involved Federal agencies and the efforts of State and local governments and private citizens, the Bay and its resources will be restored to enhance its commercial and recreational uses.

Mr. Chairman, this concludes my prepared testimony. I will be happy to respond to any related questions.

United States Department of the Interior
FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

ADDRESS ONLY THE DIRECTOR,
FISH AND WILDLIFE SERVICE

0 1986

Honorable Charles McC. Mathias, Jr.
United States Senate
Washington, D.C. 20510

Dear Senator Mathias:

It was my pleasure to appear before the Senate Subcommittee on Government Efficiency and the District of Columbia on June 24, 1986 and to participate in the hearing concerning the future direction of the Chesapeake Bay Clean-up Program.

Your letter of July 21, 1986 included some additional questions resulting from that hearing and requested responses to be included in the record. Those responses are enclosed and I hope they provide the information you sought.

The Fish and Wildlife Service is strongly committed to the Bay restoration effort because of its importance to fish and wildlife resources. The slogan "Take Pride in Chesapeake Bay" has been adopted for our role in the clean-up program and we are enthusiastically looking forward to improvement in the Bay habitat.

Sincerely,

Frank Dunkle
FRANK DUNKLE
DIRECTOR

Enclosure

Responses of The Fish and Wildlife Service to Questions Relating to the Oversight Hearing of June 24, 1986 on the Future Direction of the Chesapeake Bay Program.

1. How are you keeping the focus on living resources a priority in the Chesapeake Bay Program?

All of the Fish and Wildlife Service's activities on the Bay Program are focused on living resources. Service objectives are aimed at reducing nonpoint source and point source pollution, documenting trends in living resources, restoring striped bass stocks, and providing educational material. Studies are being done on the Choptank River to assess the impact of various land use practices on fish and wildlife. The use of forest streamside buffer strips for pollution abatement and a "cause and effect" model for revision of the Choptank River Water Quality Plan illustrate how certain activities affect living resources.

With respect to point source pollution, the effects of selected contaminants on fish and wildlife are being studied. These studies involve tissue analysis, histopathological examination, and bioassays. Samples are obtained at four sites where effluents are being discharged with Federal/State National Pollutant Discharge Elimination System permits. Service efforts are also determining if current water quality standards are adequate to support viable populations of fish and wildlife.

The Service is monitoring the annual abundance and distribution of submerged aquatic vegetation. In cooperation with the Corps of Engineers, the Service published an identification brochure for use by citizens who are helping the agencies locate beds of aquatic plants. The Service will soon complete a summary report on trends in aquatic vegetation since 1978 and is also preparing a report on the impacts of channelization on the vegetation.

A study of the nesting of black ducks on Kent Island has been completed and a report is expected within two months. The report will address how habitat changes have affected this popular Bay species. A summary report on the former plight and current status of Chesapeake Bay osprey is being prepared. A series of atlases will soon be published on Chesapeake wetlands. They will be valuable for land managers in identifying these valuable habitat areas, and may prove especially useful with respect to the Farm Bill. Additional Service activities concern the impacts of various shoreline alterations on fish and wildlife habitat.

The Service has emphasized the incorporation of fish and wildlife priorities and needs into Phase II of the Bay Program. The Service is one of four agencies to have a member on the newly established Living Resources Task Force.

2. Have you considered the subtle cumulative impacts of anthropogenic degradations in the Bay?

The Service is acutely aware of the serious cumulative impacts on the Bay of various human activities. These impacts include wetland alteration (drainage and fill), shoreline development and deforestation. Based on its responsibilities to review Federal projects and wetland permits and provide advice, the Service has been able to address its concerns about certain cumulative impacts. The Service is using a technique, referred to as "Cumulative Impact Assessment," to identify critical causes of environmental degradation, and hopes to implement the techniques in Phase II of the Bay Program. If properly used, the techniques will assist in developing effective multiagency management strategies.

3. What actions have been taken to control erosion of refuge shorelines, especially Mason Neck Refuge?

The Service has five National Wildlife Refuges that border the Chesapeake or its tidal tributaries. Four of these have some shoreline erosion problems, especially Mason Neck NWR. At Mason Neck, a feasibility study is planned for fiscal year 1987 to assess the usefulness of reducing the slope of eroding cliffs and stabilizing them with vegetation.

A feasibility study will also be conducted at the Eastern Shore National Wildlife Refuge to assess what kind of erosion control is best for 1.5 miles of shoreline. Eastern Neck NWR and Presquile NWR shoreline erosion problems can be corrected with sheet pilings and rip-rap; however, costs for full control will be high.

4. What is FWS doing to retard agricultural runoff from refuges?

The Service uses agricultural best management practices to retard pollution on all of its Bay refuges with agricultural fields. At Blackwater NWR, for example, grass filter strips are used in low areas to reduce runoff and absorb nutrients. At Blackwater NWR, a winter cover of clover and rye grass is planted annually in agricultural fields to reduce water and wind erosion and to recondition soil. At Eastern Neck Refuge, where moderate slope occurs, grassed waterways are used to reduce flow, and winter cover crops are also planted.

5. Is FWS doing everything possible to restore striped bass and other anadromous fish?

The Service is working cooperatively with Maryland and Virginia to restore striped bass by hatchery production and releases of fingerlings. The success of the program is being assessed by a tagging and recapture effort; in 1985, about 200,000 striped bass fingerlings were tagged before stocking. National Fish Hatcheries are filled to capacity this year with Maryland source fry in Alabama, Georgia, North Carolina, Ohio, Virginia and West Virginia. The stocking of fry in Virginia is expected next year.

6. How do you ensure that Bay objectives are integrated in your agency's programs?

> Three general pollution problems are identified by the Bay Program: nonpoint source pollution, point source pollution, and a decline in submerged aquatic vegetation. The Services restoration objectives focus on these problem areas. Direct responsibility for the restoration effort has been delegated to the Division of Ecological Services, a branch of the Service that is responsible for habitat issues, especially those dealing with wetlands and estuaries. Other branches of the Service, including Fisheries, Refuges and Wildlife, Research and Development and Public Affairs have contributed to meeting Bay objectives.

7. What mechanisms are used to assure that Bay goals are considered when making program budget decisions affecting environmental problems on the Bay?

> Involvement in the Bay Program has been a high priority of the Service. The Service has an ambitious Bay Program and has a budget adequate to support that effort, which is now roughly one million dollars. To provide effective management of the Bay funds, lead responsibility for the program was placed in the Annapolis Field Office, an office which has been involved with Bay resource problems for over a decade. Base funding for other programs that generally enhance the Bay effort will bring total expenditures to about 2.5-3 million annually. Efforts are made to keep staffing needs adequate without jeopardizing funds for critical field work.

8. How do you view Mr. Lee Thomas proposal about forging a new Chesapeake Bay Agreement similar to the Great Lakes Water Quality Agreement, and what do you believe to be an appropriate time-frame for development of such a document?

> Mr. Thomas suggestion is generally a good one from the standpoint of establishing effective water quality standards, Bay-wide strategies, and load limits. The Chesapeake Bay Program, however, is already heading in that direction with Phase II of the restoration plan. It is imperative that all members of the restoration effort take advantage of what was learned in the Great Lakes Program, or similar programs, and incorporate that knowledge into Phase II. Development of a new agreement would be time-consuming without commensurate benefit. The Service believes that a new Chesapeake Bay Agreement is unnecessary in light of Phase II but is willing to pursue such an endeavor if clear benefits can be expected beyond what is now occurring with the current Bay restoration strategy.

Rep. Helen Delich Bentley's Remarks
Before the
Senate Hearing on the Cleanup of the Chesapeake Bay
June 24, 1986

Mr. Chairman:

I am gratified that you have provided me this opportunity to express some important facts about the recent efforts to restore the Chesapeake to its former place in the lives of those of us fortunate enough to live under its influence. Too often we forget that the Chesapeake is a national resource, a unique part of our heritage and perhaps unique in all the world.

For the past 18 months, here in Congress, I have been fortunate to be part of the two committees, Committee on Public Works and Transportation and Committee on Merchant Marine and Fisheries, most directly involved in the effort to build the framework upon which we will restore the Bay to its former glory as a channel of commerce, a recreation wonderland and a storehouse of nutrition for the region and for the nation.

It would not be sensible to make further plans for the improvement of the environment of the Bay without assessing the progress already made. In many instances, voluntary restraint and in others, a heightened awareness of the price of pollution prodded by local and national statute and regulation, have together made a beginning to the fight to renew our water based heritage.

Maryland has a proud tradition of bipartisan cooperation in working to represent the interests of the people of Maryland. You, yourself, Mr. Chairman, are a classic example of that bipartisan spirit. We have, together, members of both political parties, the public and various interest groups, made a good beginning toward restoring the patrimony of the Bay for ourselves and those who come after us.

There is a great deal yet to do. That effort will require cooperation among citizens, legislators, industry and conservation groups. Let us hope that, as we go forward with the work, the spirit of cooperation can be preserved so that the goal will be realized as quickly and as smoothly as is humanly possible.

As a member of the Maryland Congressional delegation, it is a pleasure to have this opportunity to join my colleagues in taking a closer look at what has been achieved and what remains to be done to restore that great estuary, the Chesapeake Bay. It is most benefical to conduct Congressional hearings such as this one, so that we may work on federal, state and private levels in a spirit of cooperation to restore the Bay.

Congress first acted in a comprehensive response to restore the Bay in 1975, when the Appropriations Committee made $5 million down payment for the $27 million study of the Bay. It is also reassuring to see the regional commitment and contributions made. In 1983, Maryland, Virginia, Pennsylvania and the District of Columbia join in a commitment to restore the Bay. We have come a long way. Efforts to "Save the Bay" continue to increase.

The Mid-Atlantic states region has the good fortune of having the Chesapeake Bay within its region. With the good furtune of having the estuary within our region also comes the responsibility of maintaining and restoring the water quality and healthy environment of the Bay's living resources.

It has been only ten years since Congress first authorized the U.S. Environmental Protection Agency to conduct a major study of the Bay's water quality and living resources. In these short ten years significant progress has indeed been made. Progress has been achieved only by federal, state, local and private interests working together. However, restoration is by no means complete.

As a member of the House Committee on Public Works and Transportation, I participated in markup and passage of the Water Quality Renewal Act of 1985, H.R. 8. In subcommittee markup of the bill, I offered an amendment which received unanimous approval. My amendment to the bill will ensure an increase in participation by local governments and regional councils with the U.S. Environmental Protection Agency in distribution of federal funds. The federal funds are designated for control of nonpoint source pollution.

Control of nonpoint source pollution is important because half of the water pollution of the Upper Chesapeake Bay results from such land runoff pollutants. Included in the House passed version of the bill, was my amendment to provide additional funding for the EPA Administrator to continue the Chesapeake Bay Program. When the appropriation was originally authorized, President Reagan gave support for the program to restore the Chesapeake Bay.

Under the House passed version of the Clean Water Act, Maryland will receive $58 million for sewage plants and $13 million per year in additional funds for the Chesapeake Bay office. Control of wastes entering the Bay has proven to be one of the major factors in restoring the water quality. Maintaining sewage plants around the Bay is a key to a successful restoration project.

Coordination of federal and state efforts to improve the water quality will continue to be provided by the Chesapeake Bay Program. The program determines the impact of sediment deposition in the Bay and identifies the sources, rates, routes and distribution patterns of sediment depositions.

Studies continue to be made to determine the impact of natural and man-induced environmental changes on the living resources of Bay and the relationships. The program places emphasis on the pollutants of nutrients, chlorine, acid rain, toxic waste, and heavy metals, with special attention given to the changes to striped bass.

The effort of the federal government is not alone in this effort. The state of Maryland has established the Chesapeake Bay Critical Area Commission. The commission was started in 1984 in response to the deteriorating water quality of the Bay. The responsibility of the Critical Area Commission is to study the use of land within 1000 feet of the shore of the Bay and its tributaries and streams to the head of the tide.

The success of the commission has been its involvment of local land owners along the shores of the Bay. Men and women who work and live at the shores of the Bay have proven to be a vital addition to the cooperative effort to restore the Chesapeake. A successful restoration of the Bay will result from federal, state and local entities contributing to the restoration effort.

Other contributions have also been made to restoring the Bay. The Chesapeake Bay Foundation was founded in 1966 by private citizens and has been active in reviving the Bay. Corporations such as the Northern Bay - The Atlantic Richfield Corporation, Black and Decker, Caterpiller Corporation, Exxon Company, Baltimore Gas and Electric Company, Maryland National Corporation and concerned private individuals have made countless hours of volunteer service and financial contributions possible. I have been informed by the EPA that Bethlehem Steel has brought its toxic waste disposal within permit limits.

Located on the shores of the Upper Chesapeake Bay is the Army's chemical research facility, Aberdeen Proving Grounds (APG). According to the Office of Deputy Installation Commander of APG the facility has made significant contributions to protecting the Bay. I am taking the liberty to outline some of these contributions. The following has been achieved:

1. National Pollution Discharge Elimination System
Permitted discharges will reduce from about 45 in 1980 to 9 in 1986. The discharges will be further reduced to 7 by fall of 1986. One project will eliminate 24 discharges in one procedure.

2. Churchville Test Courses Area Siltation Ponds
Installed over and above legal requirement of the state or EPA, specifically to protect the adjacent critical habitan of the Maryland Darter, an endangered species.

3.Sewage Treatment
All APG sewage receives tertiary treatment.

4.Wetlands Creation
APG since the late 1950's has created over 2,000 acres of wetlands in a period where wetland destruction prevailed by releasing 5 beavers on the installation and providing protection.

5.Submerged Aquatic Vegatation, (SAV)
Since 1981, APG has been planting SAV and planted over 200 acres of wild celery, sago pond weed or redheaded grass. We average 60,000 plants per year. These species were selected as they thrive in the salinity content of Upper Bay and are native grasses that used to thrive locally. They have been shown to have a causal link to the environmental decline of the Bay's biology.

6.Forestry
APG uses 2 to 3 times the state of Maryland's mandated buffer strip to further protect the Bay from soil runoff.

7.Deer
APG supports a large healthy deer herd which provides many hours of hunting recreation. APG supplies the bulk of deer used to reestablish the current Maryland deer herd.

8.Eagles
APG has the largest eagle population in the Upper Chesapeake Bay region and has proved to be the last bastion of underdeveloped open space of the area. A management plan for their protection has been implemented. Currently, there are 3 active nests, 2 potential nests and 5 eaglets have been produced in 1986.

It is only through a willingness on the part of government, industry and private citizens that we can help bring about a successful restoration project. Over the last two decades an increased awareness has produced progress. Amid depressing signs, there are some good ones, like another increase in the eagle population, and plenty of old standards, like the appearance of juvenile spot in April and wildflowers in bloom in August.

These signs are signals that we will indeed reap continued success. Again, I commend you, Mr. Chairman, in conducting this important hearing. Together we will find the answers needed to ensure that our Bay is protected. Because the Chesapeake Bay is the largest estuary and the most important natural resource for the Mid-Atlantic region, I am committed to ensuring that the Bay is maintained.

RECEIVED JUN 23 1986

American Farmland Trust
1717 Massachusetts Avenue, N.W.
Washington, D.C. 20036 (202) 332-0769

June 24, 1986

Honorable Charles McC. Mathias, Jr.
Chairman, Senate Subcommittee on
Governmental Efficiency and the
District of Columbia
United States Senate
Washington, D. C. 20510

Dear Mr. Chairman:

The American Farmland Trust appreciates your invitation of May 29, 1986, to submit testimony for the record for the hearing scheduled for June 24, 1986, on the future direction of the Chesapeake Bay cleanup program. Please consider this memo as our response to this request.

The American Farmland Trust (AFT) is a private, nonprofit organization which was founded in 1980 to promote the conservation of agricultural resources. AFT encourages voluntary, private initiative and advocates conscientious public policies to keep the nation's prime farm and ranch lands in wise use and to assure that their essence, fertile topsoil, is not eroded. We currently have nearly 36,000 members.

Naturally, AFT is concerned about the off-site impacts of unwise land use and soil loss. A major consequence of soil erosion is the degradation of water quality. Therefore, we are interested in assisting those who plan and implement the nonpoint source control programs that directly relate to the Chesapeake Bay cleanup. Nonpoint source pollution is among the nation's most serious natural resource problems, including the watersheds of the Chesapeake Bay drainage basin.

Your letter asked that we address eight issues in our testimony. We have prepared a brief response to each as follows:

1. The authorization of the Chesapeake Bay Program expires in 1988, but the restoration effort will take years. What do you see as the federal role in the Bay restoration effort beyond 1988? Do you see a need for a Bay re-authorization bill beyond 1988, and if so, in what form?

> The authorization for the Bay Program, in whatever formal form is necessary, should be continued. The Environmental Protection Agency (EPA) still needs to have the federal funds and the coordination function now provided. Perhaps when the Clean Water Act amendments now being discussed in Congress become law, the appropriate non-

point source authority and eventual funding will be the best way to implement the nonpoint source programs. There is no question about the length of time needed to correct the pollution problems that have been developing for many years. To allow the accelerated efforts now underway to diminish would be foolhardy. The nonfederal governments and the private sector would probably read any lessening of the federal role at this stage with some dismay.

2. Regardless of whether or not there is a re-authorization bill, how do you plan to integrate your program into phase II of the implementation stage? What federal funding and program resources will you need to effectively accomplish your objectives in phase II?

As we understand the process, phase I was the planning and reporting phase. Phase II - implementation - still has an urgent need - establishing quantitative goals for each pollutant that needs to be reduced or eliminated. The load reduction needed of each Bay pollutant should be separated into point and nonpoint sources. The final step is to assign the responsibility for the loadings to be achieved on a realistic schedule. The role of each federal, state and local government and agency should be identified. The contribution expected from the private sector must also be part of the process of setting the quantitative goals for ultimate cleanup of the Bay. AFT can assist in those areas where we have had experience. We have knowledge acquired from comparable work on the Great Lakes System.

We are not seeking federal funding and program resources at this time.

3. Are these specific interim nutrient-reduction goals that can be implemented within the next year for point and nonpoint sources of pollution? If so, what should those goals be and how can they be implemented?

The development of the quantitative goals and their integration into each state water quality plan will help identify, by rivers and tributaries, the specific interim nutrient-reduction goals that could be implemented in the short term. The agricultural sector has identified nonpoint sources that are problems. Soil loss and sediment reduction, management of animal wastes and proper application of fertilizers and the pesticides used in farming are high priority programs.

4. What immediate, new initiatives could be undertaken to supplement the phase II action plan?

> An aggressive effort to identify and acquire conservation easements over key parcels or buffer zones either through donation or acquisition by private sector organizations has great potential. The easements might retire land or simply require Best Management Practices.

5. How will living resources and habitat protection concerns be incorporated into phase II objectives? What research or initiatives on living resources and habitat protection is needed to meet phase II objectives? What are the future funding needs in this respect?

> The 1985 Farm Bill has a Conservation Title that can be utilized where appropriate. The United States Department of Agriculture (USDA) should address the role of the Conservation Reserve, the Sodbuster and the Swampbuster provisions and the Conservation Compliance requirements. These add to the traditional programs. A focused effort to increase participation in the Conservation Reserve has been effective in Colorado, and Minnesota has developed its own program to increase the retirement of highly erodible acreage . Such a campaign would likely be very cost-effective. The research needs are many and include the long term problem of relating the source of the pollutant to the impact on water quality. This is needed as a high priority for those nonpoint sources attributed to agriculture. These sources are diffuse and usually small as a single event, but they have a large cumulative impact on water quality if not reduced or controlled.

6. How can phase II toxic or other harmful substance contamination of surface and ground waters of the Bay area be incorporated into phase II?

> Toxic or other harmful substance should, to the extent possible, be controlled at the source. The major effort should be preventative. In some cases the best approach would be to stop its production or limit its use in the Bay Basin. This, of course, is not the most satisfactory solution in most cases in our society. Therefore, the reduction into surface waters should be a high priority for those toxics that could impact human health. These reductions should be of benefit to underground waters as well. The misuse of toxics is a continuing challenge requiring education and training.

7. With any complex management structure, as in the Bay cleanup program, there is always room for improvement. How can the present coordination and Executive Council management structure be refined?

> All states must be involved in the process of planning and implementation. Although Maryland, Virginia and Pennsylvania have significant roles, the states of New York, Delaware and West Virginia must be participants. They all need a common sense of direction to make the long term improvements expected for the Bay. The present Executive Council needs more time to prove they can give coordination and management needed to effectively cope with the multiple jurisdictions that need to cooperate. The problem of centralizing the authority to dictate the solution is that in our democratic system it will not be accepted by those who must share the responsibility.

8. From your perspective, how can the federal government encourage greater local government participation in the Bay cleanup process?

> They must have the opportunity to realize how they will benefit from the Bay cleanup. Local governments have many problems and limited resources. However, almost ever Bay pollution source is site-specific in a local government area. Therefore, they too must have that sense of direction and share in the resources available to fully implement the plans for ultimate Bay restoration.

Mr. Chairman, thank you for the opportunity to present our views and offer suggestions for the Chesapeake Bay cleanup program this morning. The American Farmland Trust will continue to assist in the very important work of restoration of this important natural and economic resource.

Sincerely yours,

Ralph Grossi

Ralph E. Grossi
President

REG/esb

ACTIONS NEEDED TO REDUCE CONTAMINATION PROBLEMS IMPAIRING CHESAPEAKE BAY FISHERIES

American Fisheries Society
26 May 1986

L. Eugene Cronin
Annapolis, Maryland

INTRODUCTION

It is appropriate to review the evidence and the indicators related to the hypothesis that there are indeed serious contamination problems affecting the fish and fisheries of the Chesapeake Bay. Much of the basis has already been presented in this symposium.

I. Contaminants are numerous and sometimes abundant in the waters, sediments and biota of the bay system (Helz).

II. Captured fish sometimes bear significant burdens of contaminants (Bender). The degree of injury is sometimes, but not always, evident and it is pertinent to note that we see the survivors of any mortality that may have occurred.

III. The bay system, especially the fresh and oligohaline regions, has historically had enormous value as a hatchery and nursery area (Olney).

IV. The early life history states of fish are the most susceptible to contaminant effects (Olney).

V. Andromous fish, dependent on the areas which receive most of the contaminants, have generally and severely declined in abundance and availability (Austin, Rothschild et al).

VI. Net reproductive success is poor for these species and contaminants may play one or more roles in such failures. Obviously, other factors may also be important.

The hypothesis appears to be minimally supported and [illegible] actions are [illegible].

How adequate is our present knowledge linking the contaminants to wild stocks of fish and other biota? Briefly summarized:

1. There is a considerable array of laboratory data on acute toxicity of specific elements and compounds (Sheehan 1980, White, Ed. 1984).
2. There is very limited data on chronic effects, or the effects of mixed contaminants, or synergistic actions, or on impacts on communities, ecosystems and the relevant ecosystem.
3. Transfer of predictions and projections to field conditions has been notoriously inadequate.
4. Therefore, we cannot now adequately impute contaminants to the kind, degree or significance of injuries to fish which we suspect in Chesapeake Bay and other estuaries.

Several authors have reached the same conclusion, including:

a. McKiernan, writing on nutrients, "There is considerable difficulty in demonstrating unequivocal 'cause and effect' between changes in environmental quality and trends in living resources." (p. 37)
b. Hale, "It has not been possible to prove a causative connection between the incidence of [illegible] distributed contaminants and the [illegible] of [illegible] deterioration in fisheries." (Ho, p. 5) and "Although we know quite a bit about [illegible] contaminants' [illegible] behaviour, we still know

rather little about their biological impact. Measurements of sediment concentrations do not provide a direct indication of the availability of toxic materials to organisms. The techniques needed to assess availability are only now being developed." (ms. p.).

and "A link between (regional) contaminants and changes in biota has not been established."(Summary, Slide 1)

- Report by the National Academy of Science and National Academy of Engineering on Wastes Management in the Coastal Zone, (1970). "It is now impossible to make quantitative predictions on the effect of waste disposal in the oceans, or even to measure the full effects of such introductions as have occurred." (p. 63).
- Goldberg, Editor, in workshop report on Scientific Problems Relating to Ocean Pollution (1979), from the Panel on Biological Effects, "Our information extent of pollution effects is based on laboratory and field studies; however, it is inadequate to support even the simplest comment about the impact of marine pollution, particularly low-level contamination." (p. 209)

We cannot, except in a small number of cases, measure, predict or adequately evaluate the effects of contaminants on fish or other biota in the Chesapeake Bay or other estuarine systems.

I am convinced that the most urgent and important task facing our efforts to restore the quality and uses of the Chesapeake Bay system is that of linking correctly pollutants and their biological effects. Only then can we determine the present degree of injury, define habitat requirements, establish meaningful goals, monitor the Bay with significance, select the most effective corrective measures, quantify improvements and justify the costs. That essential task has hardly been begun.

THE DIFFICULTIES

This necessary achievement is dauntingly complex and difficult to complete. It is perhaps the most challenging problem in coastal science, for the following reasons:

I. The sources of contaminants are many, with over 5,000 industrial and municipal point sources in the watershed plus all of the non-point run-off. These inputs vary over time, and sampling and measurement are expensive and hard to achieve.

II. This is a dynamic estuarine system, with complicated physical circulation, variability on many scales of time and place, complex chemical processes and hundreds of biological and biochemical interactions.

III. Many of the species, especially the fish, are highly mobile or migratory.

IV. Our knowledge base on many of the important linkages and processes is poor, and many kinds of disciplinary and multi-disciplinary research are required. There are exceptionally serious problems in establishing, funding and sustaining multidisciplinary cooperative programs (NRC Panel on Estuarine Research Perspectives, 1983).

V. It will be necessary to develop adequate knowledge of the sources, routes, rates, sinks, chemical forms, bioavailability and, most important, biological effects on species, populations and the ecosystem. Research on each of these is important, but only the completion of the entire set promises to be sufficient.

VI. We are now spending $1.5 million on the development of hydrologic and transport models. Good models of the significant effects of contaminants will be at least an order of magnitude more difficult to develop. Funding is not now visible.

There is a serious temptation to terminate this paper at this point and expect that the task will never be completed to a useful degree, or not before we have destroyed most of the value of the Bay and other estuaries. I am convinced, however, that a rational and tractable approach can and must be made if we are to prevent serious loss through ignorance and risky public policies.

A PROPOSAL IN TWO PARTS

There are two courses of action which can result in substantial reduction in the damage that contaminants cause in Chesapeake Bay fish and fisheries. One is a major program of structured research to provide the quantitative information necessary for knowledgeable control of such pollution. The second involves the establishment and effective enforcement of new standards, based on the acceptance and use of new policies in the control of release of contaminants into the Chesapeake Bay system. The potentials for value of these actions is not limited to the Chesapeake, since they are of national and international significance. Neither are these actions limited to fish, which are exceptionally important, since they are based on reduction of serious impacts on the complete ecosystem and its biological health. In my opinion, that holistic approach is critical to the protection of fish, which live, feed, move and reproduce in the ecosystem of the estuary. They cannot be singled out for treatment alone with full success, although some studies on fish are urgently needed and important.

Many agree that the ecosystem approach is required, including Joel Hedgpeth (1977), the Panel on Estuarine Research Perspectives set up by the National Research Council (1983), Oviatt, White and Robertson in their summary and synthesis of the volume Concepts in Marine Pollution Measurements (1984), the members of the Fisheries Management Workshop for Choices for the Chesapeake: An Action Agenda (1983), and Cronin and Roberts, writing on testing of the biological effects of pollutants in Ten Critical Questions for Chesapeake Bay in Research and Related Matters (1983).

A RESEARCH PROGRAM

Many research studies have been made on the toxicity of chemicals in the estuarine environment, as noted by Perkins (1974), White (1984), and others, and much of it has been of high quality. There have also been several pertinent summaries of research needs, and these also have high value (Goldberg 1979, Cronin and Roberts 1983, Kohlenstein 1983, Citizens' Program for Chesapeake Bay 1983, National Research Council 1983, Oviatt et al 1984, White 1984, and McClellan and Jaber 1985).

There has not, however, been a detailed design of or commitment to a comprehensive sequential research program which would provide definitive answers to the question of the effects of contaminants on the fish and other biota of the Chesapeake Bay and other estuarine systems. There is no statement of the probable step-by-step posing of hypotheses, experimental research, replication, verification, interpretation and progress in a program to (1) adequately measure contaminant introductions and reservoirs, (2) trace them in the system, (3) determine the biological effects with prediction value, and (4) assist adequately in preventing deleterious effects. For the Chesapeake, there are no research designs of this level of complexity--or adequacy. A detailed program was proposed for determining the full effects of releases from sewage treatment plants, but it was lost in the bureaucratic maze in Washington. Statement of 8 hypotheses relating to the decline of striped bass, later expanded to 14 (Cronin 1980), promised to lead to definitive research. Unfortunately, it was never implemented and we are still conducting a variety of unrelated or weakly related projects which can accomplish much less. The hypotheses included contaminants, spawning stocks, predation, climatic events, power plants, disease, and other possible factors. It is most regrettable that these were not completed. Perhaps we would now know what we must do to restore the stocks.

The most relevant successful program that I have seen is the Co-ordinated Mediterranean Pollution Monitoring and Research Program (MED POL), which has established a set of 11 steps from baseline surveys through monitoring; research on the effects on species, populations, communities and ecosystems; and to establishment of effective controls (UNEP 1984). This is a central and essential part of the "Mediterranean Action Plan" described in an excellent issue of the journal *Ambio*, from the Royal Swedish Academy of Sciences in 1977.

In such a program, several steps are essential:

A. Goals and objectives must be clearly defined but open to modification.

B. The extensive relevant existing knowledge must be brought into focus.

C. A rational but flexible decision tree for the research must be designed, ranging from pilot studies through necessary projects to decisions.

D. Progress must be evaluated in the continuous evolution of the program as hypotheses are accepted, modified, or rejected.

E. Funding must be sufficient, continuing and responsive to new knowledge.

F. The products must be effectively communicated to those responsible for management and others who need to know.

Such a structured but flexible program is feasible. The most common analogue is that such a program took us to the moon and beyond, but there are other precedents. The design, oversight and management of such a program could be accomplished by an excellent small interdisciplinary team from academic and management institutions. They must act above parochial interests and stimulate both funding and the participation of scientists of very high quality. The research must be so well done that each step is definitive and provides the basis for next steps. This must combine the freedom such scientists require for best work with timely completion of essential projects, which is not an easy achievement. For the Chesapeake Bay, the Chesapeake Research Consortium can effectively lead this program, in close cooperation with top-quality persons from the National Oceanic and Atmospheric Administration, Fish and Wildlife Service, Geological Survey, and Environmental Protection Agency, and with valuable guidance from pertinent state agencies and public interest groups.

The Chesapeake would be a superb site for such a program because of its strong scientific community and the exceptional existing knowledge base. Obviously, successful progress and achievements would have immediate transfer value around all coasts in this and other nations.

I can not and will not attempt to detail this structured research program at this time. The keys for initiation lie in selecting the right persons for program design and in the development of commitment of adequate funding over the decade or more which will be required.

Many tools are available for contamination hazard assessment. There are field observations of concentrations and effects from pollution and from accidents. There is a significant literature from laboratory studies of acute and chronic toxicity on individuals and species--but very little on communities and virtually none on the ecosystem. Some valuable process studies are underway. There is experience in the use of microcosms and mesocosms, which expand knowledge toward community effects. There are potentials for manipulations in the field to provide the critically important extrapolation of more limited experiments. Analytical chemistry now permits both high accuracy and the processing of a large number of samples. Primitive models of the Chesapeake ecosystem exist (Green 1978) and improved ones are under development (Ulanowicz 1983). A listing of 126 "important" species has been achieved based on commercial or recreational value, known ecological significance or abundance; and the program can be designed around a refinement of that list. Of these, 21 are fish, including 11 commercial species, 4 predators and 6 which are important in the food web. A list of "priority pollutants" has been prepared and it can be improved to be more pertinent to present and potential contaminants in the Chesapeake. The broad structure of the Chesapeake Research Consortium exists, with considerable successful experience in multi-institutional programs and we do not need to create it.

Why has such a program not been done? Why have we never had such a structured program on contaminant problems? How could we have spent tens of millions, perhaps a hundred million dollars, in 15 years of programs related to the Chesapeake Bay and missed this key question of predicting the effects of contaminants? There are at least 5 reasons:

1. The task is complex and very difficult.
2. "Structured research" conflicts seriously with our habits and prejudices about excellent research.

3. The academic reward system has not highly rewarded team research but favored project research.
4. It is extraordinarily difficult to create and sustain any well-coordinated research program which involves state and federal institutions as well as diverse academic institutions because of conflicting policies and practices, budgetary and administrative complexity, and self interests.
5. Budgets. Such a program requires flexible use of large sums over an extended period, available for interdisciplanry use. These are formidable obstacles for funding agencies.

Of course it can be done. Dr. Robert Livingston in Florida has achieved a program of comparable complexity, drawing on many individuals and opportunistically from many sources of support. Even designing such a sequential program provides a road map for those who can undertake the hundreds of necessary sub-projects.

Surely, if 17 Mediterranean nations, including Israel, Egypt, Lybia, Syria, France, Turkey, Italy, Spain and Yugoslavia can agree on and implement the Mediterranean Action Plan and the Pollution Monitoring and Research Program, the Commonwealth of Virginia, State of Maryland and a small number of federal agencies can broaden the present Chesapeake Bay Program to conduct and apply a Program for a Living Chesapeake.

NEW STANDARDS FOR CONTAMINANTS

Water criteria and standards exist, and they are under constant review by the states and federal government. They appear to be seriously deficient for the Chesapeake Bay and other estuaries for the following reasons (Cronin and Roberts 1983):

- Toxic levels have frequently been established for freshwater species and transferred to estuaries without recognition that the environment and biota are fundamentally different.
- The toxic effects which have been determined for estuarine species have frequently ignored the substantial effects of salinity on the organism's response, either because salinity affects bioavailability or can stress the test organism.
- EPA has noted that toxicity data on the 125 "priority pollutants" are completely lacking for at least half of the most important fish species of Chesapeake Bay.
- The usual species response tests fail to take into account community interactions such as food supply and predation, sensory disruption, etc., and therefore community and ecosystem effects cannot be predicted in the open bay.
- Of the array of chemicals which have already reached the bay, including several hundred organic compounds and scores of inorganic materials, only a small number, perhaps 10%, have been tested against any bay biota.
- Probably fewer than 2% of the species of the bay have been used in tests of pollutant effects.

We have relied excessively on arbitrary choices of numbers and on available technology rather than the sound scientific basis urged in the previous section of this paper. That basis cannot be achieved quickly, so I propose a complementary approach, designed to produce rather quickly a new set of standards for contaminants. The purpose is to assure that we will not knowingly cause damage to fish and other biota from the contaminants.

The first step is the full recognition that the Chesapeake Bay is a vastly valuable living resource system, providing food, recreation and aesthetic enjoyment. The biological quality which sustains these uses must be preserved above all other characteristics. We must determine that we will not permit biological damage.

Toward that target, standards must be freshly defined. In some cases, old standards will be confirmed and retained. In many cases, it is probable that entirely new standards must be justified and adopted. Even in the absence of the strong scientific evidence we wish, the following steps can protect the bay. The basis can be established within a year.

A. Accept the 126 important species and their interactions as targets for proteciton.

B. Develop a listing of the present and probable contaminants of the bay's waters, sediments and biota.

C. Establish an expert panel of the scientists who have the very best knowledge of the effects of these contaminants on the important species, even though it is severely limited. Draw from academic, industrial and governmental personnel, and provide them with sufficient time and support.

D. For each contaminant, develop the best possible estimate of the level of concentration which will be injurious to the most susceptible stage of each species (and assemblage if feasible). When possible, additional estimates should be added on the effects of seasons, salinity and other factors, always seeking the lower edge of injurious concentrations.

E. For each contaminant, have the panel establish a numerical standard lower than the estimated threshold of injury. They should provide a margin of safety as wide as is proportionate to our ignorance about the full effects of the contaminant.

F. Vigorously apply and enforce these standards, far above the present pattern of NPDES permits, dependence on data from the potential polluters, thin enforcement efforts and slow procedures for assuring compliance and punishing violators.

To the degree possible, we must also clean up old messes like Baltimore Harbor, Elizabeth River and other sites, since the principal contaminant load is the accumulated one, not present input. This will require significant funding and careful approach, as was demonstrated in an assessment of the alternatives for corrective action in Baltimore Harbor, when the best present action for protecting the environment was found to be leaving the pollutants in place in the sediments without disturbance.

We must also pursue an expanded research program to improve the standards. New learning on biotoxicity involving communities, species and the ecosystem will permit the standards to be increasingly accurate. For instance, we need *in situ* field studies of the effects of contaminants over the wide range of environmental conditions experienced by anadromous fish and resident species. We also lack sufficient knowledge of the life stages and their water quality requirements in our nursery areas. We must learn much more about the bioavailability of various forms of the chemical contaminants. There are many other important and researchable questions.

CONCLUSION

It is imperative that we act effectively to reduce damages done by contaminants to Chesapeake Bay fish and other biota. We cannot now predict with useful accuracy the effects of contaminants and therefore cannot manage them rationally. Two complementary approaches are recommended for simultaneous use in the Chesapeake Bay as a model for estuarine protection in the nation.

1. Structured research on a scale large enough to be definitive, with statement of goals, development of new knowledge in a rational sequence, and full adequacy to permit prediction of potential biological effects and therefore effective action.
2. Construction of new standards for all present and probable contaminants, based on expert judgment of their thresholds of effects and providing conservative margins for error proportional to our ignorance, and a new level of enforcement. Excellent research on relevant topics can continuously improve these standards.

Together, these approaches can contribute substantially to achievement of a characterization which I have modified from Joel Hedgpeth (1970)--the Chesapeake Bay is a place for life, not for death from contamination from human activities.

LITERATURE CITED

(To Be Added)

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June 12, 1986

The Honorable Charles McC. Mathias, Jr.
Chairman, Senate Subcommittee on Governmental
Efficiency and the District of Columbia
United States Senate
Washington, DC 20510

Dear Senator Mathias:

Based upon my experience as Coordinator of the Pennsylvania State University component of the Chesapeake Bay Cleanup Program, I am happy for this opportunity to relate to the eight questions posed in your letter of May 29, 1986:

1. What do you see as the federal role in the Bay restoration effort beyond 1988? Do you see a need for a Bay re-authorization bill beyond 1988, and if so, in what form?

   The results for the non-point source pollution abatement program in Pennsylvania indicate that land use for agriculture, sewage sludge disposal, septage systems, landfills, etc., all contribute to the pollution of surface and ground water. Therefore, a need exists for a re-authorization bill beyond 1988, but I am not able to recommend the precise form of the bill. More specific recommendations will be given below.

2. How do you plan to integrate your program into phase II of the implementation stage? What federal funding and program resources will you need to effectively accomplish your objectives in phase II?

   The data summary for 1983 and 1984 (see attached) and that on hand for 1985, indicate that intensive livestock (dairy, swine, poultry) systems have evolved which require that manure nutrients be utilized as the major source of N, P_2O_5 and K_2O for corn and other crops. For many farms (see the manuscript on Evolution of a Pennsylvania Dairy Farm), the production of manure has increased to the point where the requirements for commercial fertilizers have been substantially decreased. Since these farmers have been the "early-adopters" of best management practices (BMP's) for production, they are hesitant to depend upon manure nutrients as a substitute for the past effectiveness of commercial fertilizers. The program on nutrient flow on farms by Dr. Les E. Lanyon and the computerized manure management program of Dr. Douglas B. Beegle will be continued as educational programs to assist farmers with the efficient utilization of manure nutrients which is the only practical method of controlling non-point pollution by agriculture. Funding at a minimum level of $200,000 per year is considered absolutely essential for this program area at The Pennsylvania State University.

3. Are there specific interim nutrient-reduction goals that can be implemented within the next year for point and non-point sources of pollution? If so, what should those goals be and how can they be implemented?

For agriculture, much could be done to reduce nutrient loadings on farms with just enough manure nitrogen to meet the requirements of the corn crop. However, we do not have precise estimates of the number of acres and fertilizer reductions these farms represent. If these farmers and those with excess manure nitrogen could be convinced quickly to stop using nitrogen fertilizers, the use of nitrogen fertilizers would decrease substantially.

While there is more than enough manure nitrogen in Pennsylvania to meet the nitrogen needs of the corn crop, much of the manure is concentrated on farms with relatively large concentrations of animals. On these farms, ground water pollution with nitrate-nitrogen and surface water pollution with nitrates and phosphates are prevalent. For other farms, on the other hand, corn grain is grown for the grain market using commercial fertilizers. On these farms manure nutrients are not competitive with commercial fertilizer nutrients because of hauling costs and other costs associated with delayed planting, etc., where manure is transported and spread.

Farm operators with two or more animal units per acre of field corn grown for grain or silage should not purchase more nitrogen than that needed for row applications. Where soil tests indicate sufficient levels of P_2O_5 and K_2O, broadcast application of these fertilizers should be discontinued.

4. What immediate, new initiatives could be undertaken to supplement the phase II action plans?

Farming on the more fertile soils of the Susquehanna River Basin has reached a precarious condition. As indicated above, the "early-adopters" produce higher crop yields per acre, higher milk production per cow, and farm proportionately more acres of corn and alfalfa. Yet the net income has not increased proportionally because of higher land prices and higher machinery and labor costs coupled with grain and milk surpluses. Therefore, while the farmers have become more efficient in production per unit of land, their contribution of nutrients which pollute surface and ground water has increased on a per unit area of land.

I recommend that the Land and Water Research Units of The Pennsylvania State University, the University of Maryland and the Virginia Polytechnic and State University be charged with the development of a proposal to:

a. Define realistic goals for the nutrient load reductions which could be realized if animal manures in the Chesapeake Bay Drainage Basin were utilized for efficient production of crops and a sustainable agriculture in compliance with water quality standards.

b. Determine the economic effects on farmers of various alternatives for the disposal of manures by methods which remove the nutrients from surface and ground water. Alternatives may include land use controls, cost share incentives and/or taxation.

c. Develop guidelines for manure disposal which are most fair to farmers, the public and at the same time meet the goals of the Chesapeake Bay Program and sustained agricultural production.

Such a program involving research personnel would provide much needed evaluation of agricultural systems in relation to water quality and production economics and at the same time it avoids the political confrontations associated with alternatives. I recently led a group with a similar mission toward guidelines for the land application of sewage sludges (see attached PSU Bulletin No. 851).

5. How will living resources and habitat protection concerns be incorporated into phase II objectives? What research or initiatives on living resources and habitat protection is needed to meet phase II objectives? What are the future funding needs in this respect?

These initiatives would be a component of the interdisciplinary research program outlined for 4, above. With time, restrictions on land use must become an acceptable component of the lifestyle of every citizen - farmer, industrialist, public servant, sportsman, etc. With ample evidence gained from interdisciplinary (soil science, crop science, animal science, economics, geology, hydrology, sociology, wildlife, etc.) teams and taught by the public schools, it should be possible for the environmental costs of our affluence to be brought to acceptable levels without substantial costs for police action from federal, state or local governments.

An initial budget allocation of $1,000,000 per year could bring together the desired team members for the accomplishment of this greatly needed program.

6. How can phase II toxic or other harmful substance contamination of surface ground waters of the Bay area be incorporated into phase II?

For toxic metals, it has been found that enforcement of existing industrial effluent standards will provide substantial reductions in water and land pollution. Well defined standards for water quality are essential for a cleanup program. For example, if 10 ppm nitrate-nitrogen is a realistic water quality parameter, why is it so often suggested that it may be ignored?

7. How can the present coordination and Executive Council management structure be refined?

   I have no recommendation other than that under 3 and 4 above. Academic scientists are more able to wrestle with difficult alternatives than those whose livelihood depends upon a more or less favorable outcome.

8. How can the federal government encourage greater local government participation in the Bay cleanup process?

   Their participation in the program outlined under 4 and 5, above, could be an excellent approach for defining their appropriate roles in areas where safe drinking water, sedimentation, etc. are current problems.

I will not be able to attend the hearing on June 24th. I am confident that The Honorable Richard Thornburg and other Panel members will admirably represent all citizens for a substainable agriculture and a cleanup of the Chesapeake Bay. If I can be of further service, feel free to contact me.

Sincerely yours,

Dale E. Baker
Professor of Soil Chemistry

DEB:djm

cc: L. Hood
A. McDonnell
A. Turgeon

STATEMENT OF DR. GILBERT V. LEVIN
PRESIDENT, BIOSPHERICS INCORPORATED, ROCKVILLE, MARYLAND
SUBMITTED TO THE
SENATE SUBCOMMITTEE ON GOVERNMENTAL AFFAIRS, EFFICIENCY
AND THE DISTRICT OF COLUMBIA, COMMITTEE ON GOVERNMENTAL
AFFAIRS
ON THE FUTURE DIRECTION OF THE CHESAPEAKE BAY
PROGRAM
JUNE 24, 1986

Mr. Chairman, my name is Gilbert V. Levin. I am a resident of Annapolis, Maryland, and I am president of Biospherics Incorporated, a publicly owned, diversified high technology company located in Rockville, Maryland. The future direction of the Chesapeake Bay Program is a matter of great concern to me, and I am grateful for the opportunity to present my views on this important subject.

As we all know, the problem of pollution in the Chesapeake Bay will not disappear when the authorization for the Chesapeake Bay Program expires in 1988. The Bay is critically ill, and to restore it to good health will require many years of careful attention. At this point in time it would be a fatal error for the federal government to withdraw from it leadership role in the effort to clean up the Bay. The level of involvement of the federal government must remain high. However, aggressive actions on a coordinated basis by state and local jurisdictions are essential to any successful plan.

For most of my professional life I have been concerned about the adverse effects of nutrient enrichment in the Chesapeake Bay. Over twenty years ago at Johns Hopkins University, I completed by dissertation entitled, "Metabolic Uptake of Phosphorus by Sewage Microorganisms." I expanded my study of biological phosphorus removal and invented the PhoStrip process, the first patented biological method for removing phosphorus from wastewater.

Over the years, I have gained a healthy respect for what excess nutrients can do to destroy water quality and to ruin our waters for commercial and recreational pursuits. Controlling phosphorus and nitrogen is imperative if we are to clean up the Chesapeake Bay. Monitoring point source discharges of nutrients is already the responsibility of the states. The states must move to strengthen and coordinate exisiting regulations and go to all lengths to enforce violations of discharge permit levels. It is of vital importance to institute specific nutrient removal goals for the Chesapeake Bay and its tributaries, and the limitation must be strictly monitored and enforced. I feel very strongly that a point source discharge level of phosphorus any greater than 1.0 mg/l will severely frustrate efforts to clean up the Bay.

The key to nutrient control at point sources is efficient technology, and I am a dedicated proponent of biological phosphorus removal as the most efficient and cost effective way to remove phosphorus from wastewater. Biological phosphorus removal is no longer experimental or untried. I am pleased to be able to say that the PhoStrip process is an unqualified success at the Little Patuxent Water Quality Management Center in Savage, Maryland where phosphorus levels in the effluent are consistently below 1.0 mg/l.

We have the technology to remove nutrients at point sources, and we should begin immediately to limit to the greatest extent possible the nutrients flowing into the Chesapeake Bay. Inasmuch as a 1.0 mg/l total phosphorus effluent can be achieved by the PhoStrip process at lesser cost than other processes which produce higher effluents, I see no reason to accept phosphorus discharges at point sources which have a phosphorus content greater than 1.0 mg/l.

The Chesapeake Bay Program has accomplished a great deal since its inception, but there is still much work to be done. I wholeheartedly support continuing this important program, and I would strongly recommend that the federal government press on with its commitment to restore water quality in the nation's lagrest and most important estuary, the Chesapeake Bay. Thank you, Mr. Chairman, for inviting me to share my thoughts on this important subject with the committee.

Chesapeake Bay Commission
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June 23, 1986

The Honorable Charles McC. Mathias, Jr.
Chairman, Senate Sucommittee on Governmental
Efficiency and the District of Columbia
Room 442, Hart Senate Office Building
Washington, D.C. 20510

Dear Senator Mathias:

Thank you for the opportunity to provide testimony for the Subcommittee's hearings on the future direction of the Chesapeake Bay restoration effort. As a participant in that effort, the Chesapeake Bay Commission has been very encouraged by the response made by all jurisdictions to the findings of the EPA Chesapeake Bay Program. Each jurisdiction has signalled its willingness to do whatever necessary to restore the Bay to its former health and productivity. Nonetheless, the enormity of this undertaking is only now becoming apparent and the difficult decisions lie ahead. It is, therefore, indeed timely to assess the future needs of the effort.

We appreciate your efforts in sponsoring these hearings, and thank you for your unceasing support of the Chesapeake Bay.

Sincerely,

Margaret Johnston

Margaret R. Johnston
Executive Director

A legislative commission serving Maryland, Pennsylvania and Virginia.

CHESAPEAKE BAY COMMISSION

Testimony for Hearings on the Future Direction of the Chesapeake Bay Restoration Program

U.S. Senate Subcommittee on Governmental Efficiency
and the District of Columbia

June 24, 1986

The Chesapeake Bay Commission is a tristate Commission made up of state legislators, gubernatorial representatives and citizen members from Virginia, Maryland, and Pennsylvania.

The Chesapeake Bay Commission was initially created in 1980 by the General Assemblies of the State of Maryland and the Commonwealth of Virginia. In 1984, the legislation was amended by mutual consent to provide for equal membership for the Commonwealth of Pennsylvania. The Tristate Agreement on the Chesapeake Bay was enacted into law by the 1984 General Assemblies of the State of Maryland, the Commonwealth of Virginia and the Commonwealth of Pennsylvania (Maryland Annotated Code, Article NR Sec. 8-302; Code of Virginia, Sections 62.1-69-5 to 62.1-69.20; Chapter Number 25 of the Acts of Pennsylvania of 1985).

The creation of the Chesapeake Bay Commission represents an effort to examine ways in which intergovernmental coordination in management of the Bay can be enhanced and to identify and act upon those issues which can most effectively be addressed through joint actions of the three states.

The primary purposes of the Commission are to assist the legislatures of the three states in responding to problems of Bay-wide concern, and to encourage cooperative coordinated planning and action by the signatories and their executive agencies.

The duties of the Chesapeake Bay Commission are to:

- identify specific Bay management concerns requiring intergovernmental coordination and cooperation
- recommend to the states and/or to the federal and local governments legislative and administrative actions necessary to effectuate coordinated and cooperative management of the Bay
- collect, analyze and disseminate information pertaining to the region and its resources for the respective legislative bodies

- represent the common interests of the signatories as they are affected by the activities of the federal government, and assist in monitoring those activities

- provide an arbitration forum to serve as an advisory mediator for conflicts among the states.

Review of States' Chesapeake Bay Restoration Programs

At the 1983 Chesapeake Bay Conference, the Commission committed itself to periodically convening a meeting on behalf of the General Assembly members of each state for the purposes of reviewing progress which had been made in carrying out Chesapeake Bay Initiatives, and to air new issues or concerns which should be addressed. In September of 1985, the Commission held its first Biennial Review of the states' Chesapeake Bay restoration effort. The Reports of four Work Groups which preceded the Review, and the Commission's 1985 Annual Report which documents the conclusions and recommendations of the Review, are submitted with this testimony. As noted in the latter, the Commission identified the five issues which it believes are most important for the states to address in the immediate future. These are:

1. Development of nutrient load reduction goals and specific strategies designed to meet those goals.

2. Whether significant reductions in nutrient loadings can be achieved through nonregulatory nonpoint source control programs.

3. Implementation, through appropriate statutes and regulations, of complimentary and consistent fisheries management plans by Maryland and Virginia for all important commercial and recreational fisheries of the Bay.

4. Implementing sufficient control over use, and conversion of use, of land in the Chesapeake Bay Basin to prevent adverse impacts on the Bay's waters which will otherwise occur with growth.

5. Making tough decisions concerning the actual costs of producing tangible water quality and living resource improvements in the Bay.

Since the Commission has extensively documented its concerns on the States' implementation of their Chesapeake Bay Initiatives through the Biennial Review process, these comments will be directed to our concerns with the federal role and the role of the Chesapeake Executive Council.

Reauthorization of the Chesapeake Bay Program

Continuation of a defined federal presence in the Chesapeake Bay Program is essential. This need will not cease in 1988; indeed with each passing year, the decisions to be made on Bay restoration issues, both at the state and federal level, will become more and more difficult. The unifying force of an Environmental Protection Agency Chesapeake Bay Liaison Office playing a leadership role, and funded sufficiently to provide the technical expertise necessary for evaluation and assessment of restoration strategies, is vitally needed to ensure that the various jurisdictions continue to view the Bay as one integrated system. The current $10 million appropriation is not large;

it is indeed only a small fraction of funding allocated to Bay cleanup by the federal state, local governments and by the private sector. Nonetheless it is an essential appropriation, because it insures that a federal-interstate structure to develop plans for the improvement of the Bay continues to exist.

In addition, there are certain specific tasks currently undertaken by the Liaison Office which cannot in any practical way be passed on to the States. These include (1) coordination and quality control for the Baywide water quality and living resource monitoring program, (2) maintenance of the Chesapeake Bay computer system and data base, (3) conduct of research and development of models needed to assess restoration strategies, and (4) staff support for the Chesapeake Executive Council and Implementation Committee.

The Phase II Implementation Process

Phase II is a planning process which will help EPA and the states determine the magnitude and direction of future Bay restoration efforts. We expect that it will result in specific strategies which may require significant additional appropriations and new regulatory or statuatory authority in order to be implemented. One goal of the Commission will be to work through the General Assembly in each state to ensure that adequate appropriations and authorities are provided. Its second, and ongoing task will be to assess the states implementation of their Chesapeake Bay Initiatives on a regular basis.

The Commission is funded entirely through state appropriations, but may also seek grants and contracts from any available funding source. The Commission is currently chartered through 1995, and will be automatically reauthorized for additional ten year periods unless legislative action is taken by the member states to dissolve it. It should be noted the that Commission is the only legislatively created interstate governmental entity which focuses on the Chesapeake Bay. The Commission will continue its role in Chesapeake Bay restoration regardless of the nature of continued federal participation.

As a practical matter, however, continued federal support of the EPA Chesapeake Bay Liaison Office, and of the state and federal agencies participating in the Restoration effort will be necessary to complete the Phase II Planning process as it is now envisioned. Phase II, as now proposed, depends on the completion of the two dimensional steady state model of the Chesapeake Bay, as well as the development of the proposed three dimensional, time variable model. These models will assist in determining which point and nonpoint management strategies will result in desired water quality. Additionally, full support in terms of funding and technical assistance through NOAA and USFWS will be required to assist in developing plans for physical habitat maintenance and restoration as well as for defining the water quality needs of various species.

In order to continue to implement existing point source Chesapeake Bay Initiatives and to deal with the strategies that will result from Phase II, it is absolutely essential that the Clean Water Act reauthorization bill currently in conference committee be acted on expeditiously. In addition, federal support of nonpoint source initiatives through SCS and ASCS must continue.

Nutrient Reduction

You have asked if there are specific interim nutrient-reduction goals that can be implemented with the next year for point and nonpoint sources of pollution. Within the next year, the only reductions that can be implemented are those that are already established or those which do not require substantial amounts of funding, as state budgets are already set. Those current goals involve significant phosphorus reduction in the lower Susquehanna River, the upper Bay, and the Patuxent River, a cap on phosphorus discharged to the Potomac River, and a 30% reduction in nitrogen in the Patuxent River. Some progress on meeting these goals will undoubtably be made during the next year as sewage treatment plant upgrades come on line. In addition some reduction in both phosphorus and nitrogen will result from the Virginia pilot projects at Fredricksburg, Kilmarnock and York River sewage treatment plants, and at the proposed Lambert's Point sewage treatment plant, if that facility proceeds, given funding constraints.

Further fairly immediate reductions in phosphorus discharges could be obtained if the Virginia General Assembly enacts a phosphate detergent ban in 1987.

All of these efforts, while laudable, do not add up to a Baywide plan for nutrient reduction. We believe that the more important question is whether U.S. Environmental Protection Agency and the States will commit to developing and implementing a Baywide set of nutrient reduction goals in the near future. It is for this reason that the Commission sponsored H.J.R 53 and S.J.R. 18 in Maryland and S.J.R. 65 in Virginia in 1986 and is considering introduction of a similar resolution in Pennsylvania. While it is important that such goals be set using the best scientific and technical information available, their adoption can not be delayed indefinitely. Therefore, a reasonable approach would be to set goals based on analysis using the two dimensional steady state model (currently under development) which should be available early in 1987. These goals can be revised as more information becomes available through additional modeling, monitoring and research. It is important to note that such goals should be expressed in terms of capping nutrient loads at whatever levels are determined to be desirable, in order to take into account the growth of population and subsequent increases in flows which are anticipated.

The states are involved in testing strategies and technologies for point source nitrogen removal. In Maryland, nitrogen removal is being coupled with extensive monitoring and modeling in the Patuxent River. In Virginia new biological nutrient removal technologies are being tested at three sewage treatment plants. (Similar technologies could be tested in two additional plants on the Patuxent River if EPA approves use of Bay funds for this purpose.) These projects show that the states are taking the lead role in determining the efficacy of nitrogen removal in the Chesapeake Bay. EPA should recognize that these projects are key to improving our fundamental understanding of how nutrients affect estuaries, and also in understanding the technologies which may help us to deal with the problem. The Commission believes that EPA should provide full support to the states in these efforts.

As with point sources, nonpoint source reductions will be achieved through programs which the states have put in place. At this time it has not been possible to quantify the amount of nutrient load reduction that is being achieved through these programs. Additional efforts to estimate the results of agricultural cost share, outreach and educational programs are needed. While the funding that is going into nonpoint source control programs is not insubstantial, it is difficult to assess, given our current understanding of the effectiveness of various practices and our success in changing farmers' practices on a voluntary basis, whether the size of this effort is sufficient. Realistic estimates of the nonpoint source load reductions which can be achieved in both the short term and long term should be developed. While any reduction we achieve through nonpoint source programs in beneficial, the size of these reductions must be put into perspective so that water quality managers can determine the degree of point source reduction that is required.

New Initiatives

As noted above, the Commission conducted its first Biennial Review in September, 1985. As that time an extensive list of recommendations on improvements to state programs were made. The Commission's agenda for legislative action is based on those recommendations and is spelled out in its Annual Report for 1985.

Generally, what will be needed for the implementation of phase II at the state level is not so much new initiatives as determining the proper magnitude of initiatives which have already begun. Each state has addressed point sources, nonpoint sources and habitat in its "Phase I" initiatives. What Phase II will determine is how much greater a level of effort is needed in all of these areas in order to achieve full restoration of the Bay's living resources. Several new efforts can and should be initiated, however, at the federal level.

First, it is imperative that EPA reexamine its advanced treatment policy in light of new information that is accumulating on the need for nutrient control in the Bay. Congressional action may be required to bring this about since EPA's advanced treatment policy is predicated upon a Congressional directive . The alternate approach would be for EPA to adopt, in conjunction with the states, a comprehensive Baywide nutrient policy which addresses both nitrogen and phosphorus. Based on such a policy, advanced treatment in the Bay could be exempted from the normal advanced treatment review requirements.

Second, EPA should take a lead role in providing the technical work needed to develop a toxic pollutant load reduction strategy. While we believe that pretreatment, secondary municipal treatment and the NPDES permit limitations should be resulting in significantly lower toxic loadings, there is currently no way of documenting whether this assumption is actually true. Some fragmentary attempts to create an inventory of toxic discharges has begun. The States are now, however, using different methods of measuring and assessing toxic discharges. The EPA Liaison Office should play a lead role in pulling together these efforts and should document the trends in loads of various toxic pollutants. More importantly, we lack information on what loadings of various toxic pollutants the States should be trying to achieve in order to protect living resources. EPA should conduct the technical work necessary to establish criteria for toxic substances in estuarine waters. This is a national need, and will be required for restoration of other important estuarine areas. Based on these criteria, EPA should work with the Chesapeake Bay states through the Phase II process to have enforceable water quality standards adopted for the Bay.

Finally the Chesapeake Bay Stock Assessment Committee, which has been formed on an ad hoc basis through the cooperation of the NOAA Estuarine Programs Office, the states, and academia should be given permanent status and a stable source of funding. This would ensure that their work towards developing Baywide fisheries stock assessments is completed and maintained. It will be necessary to understand the population dynamics of important species of fish and shellfish and the impacts of fishing pressure and natural environmental variables on fisheries populations, in order to assess the success of water quality and habitat restoration efforts. The Chesapeake Bay states are committed to adopting consistent fishery management plans for all important commercial and recreational fisheries in the Bay. The information base for such plans, however, is weak. The fisheries management information base received no assistance from the EPA Chesapeake Bay Program, as did water quality and habitat information bases.

While not a new "initiative" other federal actions are needed if implementation of Chesapeake Bay Restoration efforts is to continue. Principle among these is reauthorization of the Clean Water Act. Also of prime importance is maintenance of agricultural conservation programs through the Soil Conservation Service and the Agricultural Stabilization and Conservation Service. Chesapeake Bay States have increased dramatically their point and nonpoint source pollution programs to provide additional protection for the Bay. Failure to continue federal assistance for sewage treatment facility conservation and agricultural conservation programs at meaningful levels will prove disastrous.

Local Government

Local government structure and responsibility vary greatly among the states participating in the Chesapeake Bay Restoration Effort. Therefore, it will be necessary for each state to determine how to involve local governments in the Phase II planning process and subsequent implementation activities. Nonetheless, greater local participation is clearly desirable.

EPA can take two actions to encourage this participation. First, the Liaison Office could play a greater role in providing information on Chesapeake Bay program activities to local government, and in assisting local planners and managers in obtaining access to technical assistance. Secondly, EPA can, through its role in the Phase II process, encourage the development of management strategies for each major river basin in the Bay drainage area, which are so specific in their goals, objectives and proposed actions, that local involvement is needed to implement them.

Role of the Executive Council

The Chesapeake Executive Council was created to "assess and oversee the implementation of coordinated plans to improve and protect the water quality and living resource of the Chesapeake Bay estuarine system." Its charge assumes the existence of "coordinated plans" but is silent on the issue of a comprehensive Baywide plan. To date, the Chesapeake Executive Council has agreed (in the form of the Chesapeake Bay Restoration and Protection Plan) to a set of broad goals and objectives and has compiled an inventory of individual state restoration efforts.

The Phase II planning process is designed to remedy the deficiencies in the first "Plan" by developing the basis for the adoption of a more comprehensive restoration strategy. The Council has not, at this point, indicated that it will act on the analysis of strategies that results from the Phase II process, nor has it begun to discuss the various issues that would be involved in the adoption of a detailed plan. It is not clear whether under its current mandate, the Council will ever adopt a Baywide plan, or whether it will merely continue to share information on individual state initiatives.

All of the participants in the Chesapeake Bay restoration effort have begun important new projects and programs aimed at the problems identified by the Chesapeake Bay Program in 1983. But the states have not yet determined by how much in each area of the Bay, nutrients and toxics should bd reduced, or how much habitat should be protected and restored. The key to making the interjurisdictional process work will be a Baywide plan which spells out the means of achieving such reduction or restoration. With such a blueprint for action, the Council's task will become clearer, funding needs will be spelled out for legislatures, and citizens will be able to determine whether needed action is actually taking place.

ƆRC

23 June 1986

Honorable Charles McC. Mathias, Jr.
Chairman, Senate Subcommittee on
Governmental Efficiency and the
District of Columbia
387 Russell Senate Office Building
Washington, D. C. 20510

Dear Senator Mathias:

Thank you for the opportunity to provide some comments on the future direction of the Chesapeake Bay cleanup program to the Senate Subcommittee on Governmental Efficiency and the District of Columbia.

I am the Director of the Chesapeake Research Consortium, Inc. (CRC) a not for profit corporation formed in 1972 by the University of Maryland, The Johns Hopkins University, the Smithsonian Institution and the Virginia Institute of Marine Science. CRC was formed for the purpose of coordinating Bay-wide interdisciplinary and multi-institutional research activities of its member institutions and other interested research organizations in the region. In addition, I presently serve as the Chairman of the Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC). I have 24 years experience dealing with research issues in the Chesapeake Bay, 15 years of which have dealt with Bay-wide scientific and institutional issues.

As we move into the next phase of the restoration program for the Chesapeake Bay, we must realize that the present structure of the Bay restoration effort is only about two and a half years old and in many of its activities just beginning to function smoothly and efficiently. The Bay restoration effort will not be a short-term endeavor. We cannot expect to undo the effects of environmental insult which occurred over centuries in a few short years. Please consider my comments in this light.

Chesapeake Research Consortium, Incorporated

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The Johns Hopkins University
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I definitely see a need for reauthorization of the federal effort to cooperate in the Chesapeake Bay restoration beyond 1988. I am firmly convinced that the non-federal partners in the effort, particularly Maryland, Pennsylvania and Virginia will continue their commitment. I am concerned, however, that without an active federal presence (and by active I mean financial) the states may allow individual state priorities to obscure the overall view that the program is now attempting to maintain.

As with any evolving program, some change should be expected. The management structure has recognized this and has made some changes (e.g. established the STAC). At the present time, the program is dealing with the difficult task of attempting to establish living resource objectives and establishing the links between living resource objectives and water quality standards. As work in this area progresses, the management structure must come to grips with the question of whether attainment of water quality standards or attainment of living resource objectives will drive the program. The latter approach can utilize a much wider range of strategies, (e.g. seasonal standards, harvest controls, aquaculture) but will require much more sophisticated information synthesis than is presently practiced.

The principal thrust of the present implementation efforts are based on the findings of the EPA Chesapeake Bay Study which demonstrated a qualitative relationship between nutrient increases and living resource decline. The evidence for this relationship is so persuasive, that the initial activities to control the rate of increase in nutrient loadings and to begin reducing the loads in critical areas is well justified. When the obvious and relatively inexpensive solutions are in place, truly difficult decisions will be required. To provide assurance that difficult (and expensive) solutions are justified, a quantitative relationship between nutrient levels and living resources must be developed. This will take specific research, research that is not presently being conducted within the program framework.

Research for research sake is not justified under a program with relatively specific goals and objectives such as have been developed for the Bay restoration effort. Specific directed research (some which may be on fairly fundamental processes) is, however, necessary to ensure that the restoration dollar is well spent.

The Bay program´s focus on water quality monitoring and improved stock assessment has greatly improved our understanding of what an effective monitoring or assessment program can provide and how it should be done. These monitoring efforts by themselves, will not, however, provide the long-term monitoring necessary to attain and maintain living resource objectives. A habitat monitoring system must be developed and implemented. Habitat monitoring is pushing the state of knowledge of ecosystem processes. An effective, relevant, habitat monitoring system for the Chesapeake Bay will require a substantial investment in research dollars. The STAC is planning on developing recommendations on research needs to support the restoration program during the fall. This information developed from this effort will be provided to you and your staff when available.

The implementation of the Bay Program is the responsibility of individual agencies, working under guidance developed by the Implementation Committee. The Implementation Committee receives policy guidance from the Executive Committee. The federal government only has one member on the Executive Council--EPA, a water quality oriented agency. With the increasing emphasis on restoration of living resources as the overall goal or objective of the Bay Program, it might be appropriate to add an additional federal member from an agency with living resource management responsibility such as NOAA. Addition of one more federal member would not per se upset the present federal/state balance as each state (and the District of Columbia) has two representatives on the Executive Council.

The most effective way for the federal government to support the Chesapeake Bay Restoration program and to encourage all appropriate levels of government to participate in this effort is to continue its commitment both with staff and funding and ensure that a portion of the funding supports an active education and citizen's participation effort. The most effective spur to government participation at all levels (local to federal) is an informed, interested public.

I strongly urge that the federal activities in the Chesapeake Bay be reauthorized beyond 1988. The federal presence is important.

My comments were developed from my individual perspective and are not to be construed as necessarily representing the opinions of the individual members of the Chesapeake Research Consortium or the Scientific and Technical Advisory Committee.

Thank you again for an opportunity to comment.

Sincerely,

Maurice P Lynch

Maurice P. Lynch, Ph.D.
Director

MPL:cw

**Citizens Advisory Committee
to the Chesapeake Executive Council**

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The Honorable Charles McC. Mathias
United States Senate
Russell Senate Office Building, Rm. 387
Washington, DC 20510

Dear Senator Mathias:

The Citizens Advisory Committee to the Chesapeake Executive Council appreciates the opportunity to present its views on the future direction of the Chesapeake Bay cleanup program. Your support and guidance over the past decade has been essential to the Bay Program, and it is indeed gratifying to know of your continuing interest. We hope that the upcoming hearing will be instrumental in focusing attention on the difficult issues that remain as we look toward another decade of work on the Bay.

You asked eight questions in your letter. We have stronger views on some questions than others. For the sake of consistency, we have organized our comments to parallel the eight questions and, in some instances, we have mentioned related issues of concern to us.

1. With regard to the federal role beyond 1988, we think it is absolutely essential that a coordinated federal presence be continued. The fact that the Bay is a national resource hardly needs mentioning. Perhaps more relevant to this discussion is the multi-million dollar investment the EPA and other federal agencies have already made in the Bay. That investment is doing two things: it is improving water quality in the Bay, and it is teaching us about management of a complex estuarine system. The knowledge we have gained, and continue to gain, about biological and chemical processes as well as human and institutional interactions has applicability all over the country. For example, the Citizens Program is working with EPA to transfer public participation skills to other estuarine programs, and this same kind of transfer of knowledge and experience is occurring in other areas. Seeing the model program through to the achievement of improved water quality, which will be most likely a decade beyond 1988, seems to us to be critically important. We want to see the Bay Program as a line item in the EPA budget, at least at the current $10 million level, and we want the participation and funding of other agencies (FWS, NOAA, SCS, Corps and USGS) to continue. A strong federal presence will also provide some continuity as the states' leadership changes.

Staff support by CPCB, Inc. 6600 York Road, Baltimore, MD 21212

2. We think that much of the discussion about "Phase II" has been confusing and unduly bureaucratic. There does not seem to be a clear understanding of what the product of Phase II will be. EPA needs to continue to consult with citizen and user groups on the implementation of the cleanup program, with added sensitivity to the public's concern that bureaucratic processes impede the accomplishment of desired goals. Phase II has to be expressed in terms that make political and public sense.

As for the role of the Citizens Advisory Committee, we see ourselves providing guidance on a number of issues. First of all, we will be involved in articulating specific goals for the mainstem of the Bay and its tributaries. We will work with other advisory committees and interest groups to do this.

Second, we expect to provide advice on a number of issues which we believe have not yet been adequately addressed. We have formed four task forces to investigate and prepare recommendations on these issues: alternative financing, nutrient policy, land management, and program integration. In each of these areas, we will make recommendations to the Executive Council concerning both short and long term policy initiatives. As you know, we are a committee of volunteers, staffed by the Citizens Program for the Chesapeake Bay. Our ability to investigate issues is dependent on contributions of time made by EPA and state agencies, for which we are grateful. Present resources available to CPCB provide the equivalent of a half-time person devoted to the CAC, and our effectiveness would be increased if we were able to retain a full-time technical person to synthesize research materials and prepare issue papers for us. Of course, we hope that the financial support provided to CPCB by EPA will be continued, so that their role as information-providers and facilitators can be continued.

3. We have not yet formed a Committee opinion on the issue of specific nutrient goals. There seems to be two schools of thought on this subject and we are trying to understand them and arrive at a carefully-reasoned view. We do believe that efforts to quantify the reductions expected from abatement programs recently put in place need to be stepped up. For example, data on sewage treatment plans and agricultural programs need to be computerized so committees such as ours can have ready access to the information. We find it is very difficult to get answers to questions which to us seem simple, such as how many pounds of nutrients are being removed by sewage plant upgrades which have gone on line in recent years. Until we have this kind of information, it is very difficult to make recommendations about how many additional pounds should be removed.

At the very least, I think we are prepared to say that no where in the Bay should nutrient increases be allowed.

4. With regard to new initiatives, there are several things which we believe could be done now, without awaiting additional studies or modeling exercises. These include a pilot program to remove nitrogen, increased enforcement activities, a stepped up effort to write new permits which include stringent toxics and nutrients limits, full implementation of pretreatment programs, and initiation of innovative funding mechanisms. In many of these

areas, EPA has an important role to play in conjunction with the states. In our view, the guiding principle ought to be that any reductions of nutrients, sediments and toxics which can be achieved by any reasonable strategy ought to be implemented as soon as possible.

There are also some institutional initiatives which we mention below (see #7 and #8).

5. Restoring the environment of the Bay to the point where it can sustain abundant and varied living resources must be the objective of the restoration and protection program. We frequently hear and are involved in discussions about "multiple use." Obviously, the Bay is an important commercial corridor and recreational asset. But the bottom line has to be living resources, and activities which make the Bay unfit for their survival have to be curtailed.

We would support additional work which will help to quantify the links between water quality and living resources. The Phase II process is designed to set water quality standards that are linked to protection of living resources. We support this goal and hope that the technical community will make every effort to reach consensus on the numbers. While the Phase II process will evaluate additional pollution abatement measures that could be implemented, it should also look at specific fisheries management techniques such as additional harvest restrictions which may be necessary to achieve sustainable populations.

We have had some difficulty understanding the relationship among the various agencies, especially on the federal level, with regard to fisheries management. We are looking to NOAA's "stock assessment" committee to be more fully involved in Phase II, and to provide leadership in the determination of appropriate water quality and habitat criteria to sustain desired fish populations.

6. Answers concerning toxic substances and their impacts on surface and groundwater seem incomplete. We think more work needs to be done in this area, to find ways of keeping toxics out of the water. Since it may be years before definitive answers about the effects of small quantities of toxics on estuarine resources is available, we support a conservative approach aimed at keeping these chemicals out of the environment. Applied research on agricultural "best management practices" clearly must continue. Other management strategies, such as the full implementation of pretreatment programs, are available to provide almost immediate benefits.

7. The management structure in its present form, which is fairly informal and collegial, seems to be working rather well. Particularly at the Implementation and Subcommittee levels, it appears that good efforts at coordination and consensus building are occurring. A concern has been expressed about the Executive Council, which seems to have had some difficulty in defining its role. Since this council is composed of people who operate at the policy level, and since it has no real authority, its job would seem to be to provide a forum for discussion of regional issues such as nutrient

policy, financing and fisheries management. In fact, the Council seems to be evolving in this direction.

We have been concerned at the lack of attendance of state secretaries. Since this is the body to whom we provide advice, we are looking to them for leadership. An additional concern relates to the changing membership of the Council. Gubernatorial elections will continue to result in a fairly extensive turnover. Because this is a fact of life in a democracy, we hope the Council as it is presently constituted will articulate a clear agenda for the coming years, so that the momentum of the cleanup effort won't be lost.

8. Local government participation has been a citizen concern for some time. Predecessors to this committee pointed out that the fate of the Bay is determined in large measure by the decisions of local governments. We continue to be concerned. Many counties and municipalities appear to have inadequate resources to properly evaluate the impacts of proposed development, to enforce erosion and sediment ordinances, to inspect septic systems, and to develop comprehensive plans that take the Bay's needs into account.

Maryland has gone further than the other jurisdictions in requiring local involvement through the passage of Critical Areas legislation. This approach - state guidelines, local implementation - could be a model for other programs.

We are also very interested in seeing the river basin by river basin approach more fully developed in the Bay area. In the past, under sections 303 and 208 of the Clean Water Act, basin planning was done, but these plans were not widely implemented. Since each river in the Bay system is different, we are encouraging EPA and the states to fully develop a basin approach, using the Phase II framework. This would entail the development of specific management strategies for each basin, and would necessitate the inclusion of local governments in the process.

At the very least, the federal government could assist local governments with technology and information transfer. Some sort of technical "loan bank," where local governments could have easy access to experts and printed materials, could be set up through the EPA liaison office in Annapolis.

In concluding our remarks, we would be remiss in not giving credit to all the legislatures, agencies and private organizations who have worked together to successfully mobilize, in a remarkably short period of time, a comprehensive Bay clean-up program. We know of know place else where such a broad commitment to resource protection and restoration has been made. We are justly proud of the accomplishments to date.

We are also realistic, and we understand that some of the most difficult issues and decisions lie ahead. The root causes of the Bay's decline are related to people, and anticipated population growth means that simply correcting existing problems won't be enough. We have to figure out how to grow without putting increased pressure on irreplaceable resources such as the Bay. Stewardship is not a short term task.

Again, we thank you for your leadership, and for providing the opportunity to comment on issues about which we care very much.

Sincerely,

Edwina H. Coder

Edwina H. Coder

Citizens Program for the Chesapeake Bay, Inc.

June 23, 1986

Honorable Charles McC. Mathias, Jr., Chairman
Senate Subcommittee on Governmental Efficiency
and the District of Columbia
United States Senate
Washington DC 20510

Dear Mr. Chairman:

The Citizens Program for the Chesapeake Bay, Inc., appreciates this opportunity to comment on the "future direction of the Chesapeake Bay cleanup program". Our comments are keyed to the questions set forth in your invitation dated May 20, 1986.

1. Future Federal Role. We are proceeding under the conviction that there is and always will be a critical need for federal involvement in the restoration of the Chesapeake Bay. In the first place, the federal government has been and continues to be a substantial contributor to the Bay's environmental problems. It operates a number of major civilian and military programs in the Bay area that can have profound and lasting effects upon the character and quality of the Bay and its waters.

Moreover, the federal government seems at long last to be taking an active interest in the deterioration not just of the Chesapeake but many other estuarine ecosystems around our country. It will bring to bear substantial scientific and technological programs to elucidate the problems and postulate the solutions to those problems where they exist. The knowledge possessed and gained by the federal programs should be integrated into the ongoing efforts in the Chesapeake Bay, just as the Chesapeake experience has been made available to the officials and scientists in other parts of the country.

Still further, and in spite of the efforts and progress being made by the state agencies in the improvement of their management capabilities, the fact remains that the presence of federal program, closely coordinated with companion state programs, can provide a stimulus and a reinforcement of state efforts that is frequently essential to the progress all desire.

The new reauthorization should make it clear that the federal agencies should use not only any special authority they may have for the Chesapeake Bay, but also their general authorities to effectively underpin the broadest possible resource management and restoration effort. Also, the Congress should maintain its interest in Bay affairs by requiring a re-examination of progress, and appropriate redirection of the program, at approximately three year intervals.

Finally, of course, the Bay's problems are rooted in deterioration of its water's quality. There is a continuing necessity for the federal government to be involved in "Clean Water" programs, and the Chesapeake must be a part of the national water improvement and conservation program. It is a recognized national resource--or "treasure"--whose mere existence demands attention from the highest levels of government!

2. Future Role of the CPCB. The Citizens Program for the Chesapeake Bay, Inc., is an independent, voluntary "organization of organizations", managed to respond to Bay problems and concerns as they arise. We intend to continue in that mode, providing the service of a "neutral forum" for the presentation and consideration of Bay-related issues. For approximately the past 8 years, we have managed the public participation in the EPA's Chesapeake Bay Program, and have consistently worked to apprise the public not only of the details of the federal programs, but of the work the states themselves are doing. We intend to continue our activities with emphasis on the role and responsibility of local communities. To be of maximum effectiveness, we will require a minimum federal grant of at least $300,000 annually. We particularly call your attention to the fact that the CPCB, Inc. neither asks nor receives any overhead funds for its sponsorship of the public participation activities related to the Bay restoration effort. All federal funds are obligated for program activities.

3. Interim Nutrient Reduction Goals. This question is one which we do not wish to comment. Suffice it to say that we support the strongest programs of nutrient reduction attainable.

4. New Initiatives. See comments on question 8. We take this question to mean technological initiatives, on which we are not prepared to comment at this time. There appears to be, however, considerable activity in the field of nutrient removal that should be adopted in Phase II as new technology evolves.

5. Living Resources and Habitat Protection. If the Bay program has revealed anything, it has been to show that the snide talk about "the Bay being studied to death" was a gross exaggeration. In reality it is such a large and complex natural system, one which has produced abundantly over the years without the necessary research on the basic facts essential to an understanding of the ecological foundation of most of the living resources, that we are only now recognizing the extent of our ignorance. What is needed is a complete scientific review of the Bay resource knowledge gaps, and a complementary study plan that will identify the critical study areas, and then lay out the details of approach, responsibility, etc. essential to get such a plan into full operation. In a commentary delivered before the recent American Association for the Advancement of Sciences, that dean of Bay researchers, Dr. L. Eugene Cronin has outlined a comprehensive "state-of-knowledge" preliminary study plan. Dr. Cronin is a member of our Board of Directors and with his approval, I append his paper for your attention and guidance.

6. Toxics and Groundwater Contamination. Again, as in question 3, the matter of groundwater contamination is basically a highly technical problem on which we are not prepared to comment.

7. Improving the Management Structure. In our opinion, the greatest problem facing the management of the Bay restoration program, save that of adequate future funding, is that none of the principal state or federal officials involved, down to and through the Implementation Committee, devotes full time and attention to the Chesapeake Bay Program. All have many other duties and responsibilities with the result that the Bay and its problems are dealt with only as another meeting, or media event, approaches. We believe it is time that each member of the Chesapeake Executive Council appoint a full-time deputy or alternate, to work with the other "deputies" and the subordinate committees to make sure that every possible effort is being made to keep the momentum of the past few years at a high pitch in high places. In this context, it may be worth mentioning that several, if not all of the extant river basin commissions operate in this mode.

We believe further, that in spite of the extraordinary effort the Environmental Protection Agency has made to give the Chesapeake Bay its consistent, top-level attention, there is still a tendency to treat the Bay program in a routine manner. Without being critical of individual efforts, the administration of the program should be decentralized to the Annapolis office, and a staff adequate to provide de facto leadership be assembled there.

You will recall the frustrations the EPA Bay Study suffered until Dr. Tudor Davies was given a clear mandate to take charge. He assembled a small but skilled staff of energetic people, and accomplished in the 3 1/2 years remaining what had originally been scheduled for the full 5 years. It was a classic example of the result of giving qualified people a clear signal and support all the way up the bureaucratic chain-of-command. We believe that something of this nature needs to be reconstituted in the Environmental Protection Agency if we are to see the kind of initiative and progress on the Bay's problems that will produce the needed results.

8. Encouraging Local Participation. While it has yet to flower, the plan developed in Virginia in the last days of the Robb administration seems to us to have promise. That was the establishment of river basin commissions composed of local officials and interested citizens whose function was to be the stimulation of local governments toward a better understanding of the impact of their actions on the Bay. Perhaps for good reason, these commissions have yet to get under way in the sense of their announced functions and goals. Only two meetings have been held, one a statewide meeting of a general nature, and in the Upper Potomac Basin at least, one at which local agencies described their current programs. We believe these commissions have a potential, but only if they get organised and begin to contribute ideas and substance to what the local governments are doing.

Honorable Charles McC. Mathias, Jr.
June 23, 1986
Page 4

Further, we feel that there needs to be a determined effort by all the state and federal agencies involved in the Bay program to interact in a more structured way with county and municipal officials. We think this might be done through the medium of the various statewide organisations of county officials. Regrettably, there seems to be little inclination in the Bay bureaucracy to promote greater involvement of these officials. Here again, we believe a greater delegation of authority to an enhanced Chesapeake Bay office in Annapolis would be at least be a means of getting started in this direction on a basin-wide basis. Certainly, as long as the local officials are not made a part of the team, they will continue to be a part of the problem. Brought into the program, they could become part of the solution.

We recognize the foregoing comments as being the barest outlines of answers to questions each of which deserves detailed answers. We appreciate, however, the opportunity to make these suggestions.

In closing, we wish to thank you again for the magnificent leadership you have displayed in your concern for and devotion to the Chesapeake Bay. We, and many others will always remember what you did to stem the Bay's deterioration and starts its restoration.

Sincerely yours,

John S. Gottschalk
Chairman

ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301-8000

ACQUISITION AND
LOGISTICS
E

20 AUG 1986

Honorable Charles McC. Mathias, Jr.
United States Senate
Washington, DC 20510

Dear Senator Mathias:

Thank you for your recent letter on the future direction of the Chesapeake Bay Clean-up program. DoD has actively worked with EPA and the states surrounding the Bay to meet the objectives of the Chesapeake Bay Agreement.

DoD feels the current Bay agreement provides a good framework for future Bay clean-up efforts. We are not sure if the modified agreement proposed by Mr. Thomas will significantly improve these efforts, and they could make the overall Bay clean-up program difficult to administer. Until details are worked out, DoD cannot respond specifically to Mr. Thomas' proposal, nor can we suggest an appropriate time frame for its development.

DoD ensures that the Bay's clean-up objectives are integrated into our programs through such mechanisms as resource management programs, sewage treatment upgrades, and environmental self-audits. We are actively looking at all our installations in the Chesapeake Bay region to determine what our impact is, and what improvements are required. We have also initiated a program to improve the operation and maintenance of our existing sewage treatment plants. DoD gives priority consideration to funding pollution abatement projects/studies in the Bay area, and requests Congressional approval for required out-year pollution abatement projects. Our Installation Restoration Program allows us to systematically identify and clean-up abandoned waste sites using funds specifically designated for this purpose.

Thank you for your interest in DoD's Chesapeake Bay program.

Sincerely,

Jim Wade

James P. Wade, Jr.

INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202

Report No. 86-113 August 8, 1986

MEMORANDUM FOR ASSISTANT SECRETARY OF DEFENSE (ACQUISITION AND LOGISTICS)

SUBJECT: Final Survey Report on the Audit of the Chesapeake Bay Program (Project No. 6SA-705)

Introduction

This final survey report presents the conclusions of our survey to determine the extent of DoD involvement in the Chesapeake Bay basinwide management program. The survey was initiated when the President's Council on Integrity and Efficiency suggested this area as a potential audit involving cooperation among the Inspectors General of the Defense and Civil Departments. Our objectives were to ascertain the degree to which DoD responsibilities for pollution prevention, control, and abatement have been carried out and whether DoD was duplicating efforts of other Federal Departments or Agencies. We concluded that further audit effort is not warranted.

Scope of Survey

We reviewed actual and planned DoD funding of pollution prevention, control, and abatement projects and studies affecting the Chesapeake Bay. This included a review of studies currently in progress aimed at improving the management of environmental programs. We reviewed test results of water samples taken daily or periodically from discharge points, wells, creeks, rivers, and the Bay at one major installation of each Military Department. We also reviewed the installation reporting of information to the Environmental Protection Agency and the States, land management practices to reduce soil erosion, and the results of environmental audits. We contacted the water administration agencies of Maryland and Virginia to determine whether all DoD installations on the Chesapeake Bay watershed within their boundaries were complying with existing Federal, State and local pollution control and abatement laws and regulations. We reviewed the Army Corps of Engineers (the Corps) role in the management of the Chesapeake Bay Program. The survey was made in accordance with generally accepted Government auditing standards for economy and efficiency audits and included such tests of records as were deemed necessary. The survey was made from December 1985 through February 1986 and included a review of funding, water testing, and other management practices for fiscal years 1984 and 1985, and funding projections for fiscal years 1986 through 1989. A list of activities visited is shown at Enclosure 2.

Background

DoD efforts in support of the Chesapeake Bay Program are coordinated by the Defense Environmental Leadership Project Office which was established in January 1984 by the Assistant Secretary of Defense (Acquisition and Logistics). Personnel from this office represent DoD on various Chesapeake Bay Program committees and consolidate information received from the Military Departments and Defense Agencies on installation level projects, studies, and activities in support of Bay programs. This office also funds Bay area studies and pilot pollution abatement projects.

The Military Departments and Defense Agencies fund the projects needed to reduce or prevent pollution by Bay area military installations. There are 64 military installations located on the Chesapeake Bay watershed that occupy about 400,000 acres or one-tenth of one percent of the total watershed land area. These installations are required to comply with Federal, State, and local laws and regulations pertaining to pollution prevention, control, and abatement. The military installations obtain wastewater discharge permits from the Environmental Protection Agency or the States, and report water test results and spills of pollutants to applicable regulatory agencies. Military installations are also subject to inspection by the Environmental Protection Agency and State and local Government personnel.

The Corps participates in the Environmental Protection Agency Chesapeake Bay Program by serving on committees established to identify research and monitoring needs. The Corps also administers the Chesapeake Bay dredging program, performs Bay area water quantity studies, and participates in public awareness programs to acquaint citizens with Chesapeake Bay related issues.

In September 1984, the Secretary of Defense and the Administrator of the Environmental Protection Agency signed a Joint Resolution on Pollution Abatement in the Chesapeake Bay. Under the terms of the Joint Resolution, DoD will give priority consideration to funding pollution abatement projects and studies affecting the Bay, develop and initiate environmental self-audits, review management practices to ensure the quality of environmental improvement projects, continue to provide wastewater discharge information to the Environmental Protection Agency or the States, and review land management practices to reduce soil erosion and other pollution from sources other than specific discharge points (nonpoint sources). In November 1984, the Corps signed a Memorandum of Understanding with the Environmental Protection Agency. This document provides for the Corps' participation in the management of the Chesapeake Bay Program and for greater cooperation between the Corps, the Environmental Protection Agency, other Federal agencies, and State agencies.

Results of Survey

We found that DoD was very actively involved in the management of the Chesapeake Bay Program. In the past 11 years, DoD spent over $190 million to build or upgrade sewage treatment plants, hazardous waste storage facilities, and oil spill prevention facilities. Completion of these projects resulted in a significant reduction of pollution by installations located on the Bay watershed. Other projects, valued at $64 million, are planned or under construction for FYs 1986 through 1989 as DoD continues to give high priority consideration to funding of projects requested by Bay area installations. To ensure that the 64 military installations located on the Bay watershed comply with Federal, State, and local regulations or have requested funds for projects that will enable them to meet current standards, the Defense Environmental Leadership Project Office recently awarded a contract to determine relative impact of DoD installations on the Chesapeake Bay and its tributaries. Upon completion of the study, the Defense Environmental Leadership Project Office expects to advise the Military Departments on where efforts should be targeted for future pollution prevention and control projects.

We visited three installations during our survey and found that water samples tested in FY 1985 for various pollutants and chemicals showed results that were usually within allowable limits. When standard tolerances were exceeded, corrective action was initiated immediately. All documentation and reports required by either the Environmental Protection Agency or the States had been submitted.

To verify that all Bay area installations were complying with existing pollution control regulations, we also contacted Maryland and Virginia state regulatory agencies that monitor the various waste management programs. According to Maryland officials, DoD installations were generally complying with Maryland regulations. Known problems were being actively addressed. One Maryland official stated that there was a problem with soil erosion at construction sites where work was administered by the Corps. However, he had not tested water samples in creeks or rivers close to the construction sites to determine if actual erosion or pollution was occurring.

Virginia officials were generally complimentary of DoD efforts on Bay area installations. One installation was slow in reporting accidental spills of jet fuel and other pollutants, however, all known spills had been reported. Another installation stored large stocks of coal for the General Services Administration. Rain water washed through the coal and flowed into the Potomac River. This lowered the pH factor to an unacceptable level. The installation felt that the General Services Administration should be responsible for correcting the problem, but Virginia officials requested the installation to take action. On the same installation, a waste chemical storage tank had leaked. The tank was emptied and there were plans to dig up the tank and the surrounding contaminated soil. Virginia officials requested that the installation pump polluted water from the site to a sewage treatment plant, purify the water, and return it to the site. The installation objected to this procedure because of the cost. Negotiations on the coal and the chemical storage tank issues were still in progress when we completed our survey.

One other pollution problem came to our attention during the survey. The soil at two small abandoned installations located on the eastern shore peninsula of Virginia may be contaminated with DDT and other chemicals. The Defense Environmental Leadership Project Office was working with the local Congressman to resolve the problem.

We concluded that all known pollution prevention, control, and abatement problems at Chesapeake Bay installations were being addressed. Pollution prevention procedures, equipment, and personnel were ready to handle emergency oil, fuel, and chemical spills. Pollution control facilities had been built and emphasis was being given to training the operators of those facilities. Numerous pollution abatement studies had been conducted or were planned but in only a few instances had contaminated soil been removed. It had been determined that the most prudent action was to allow toxic materials in the soil to remain in place. Greater damage to the water of the Bay could occur if these materials were disturbed. Therefore, the installations were continuing to test water samples near the contaminated areas to be sure that unacceptable quantities of toxic chemicals were not leaching into the Bay or its tributaries.

The Corps continued to coordinate its Chesapeake Bay maintenance dredging program with the States, to serve on Chesapeake Bay Program committees, and to participate in Environmental Protection Agency and State sponsored public awareness programs on Bay related issues. As of January 1986, no joint funded projects between the Corps and the Environmental Protection Agency for Bay cleanup had been initiated although a Memorandum of Understanding provided for cooperative efforts. We found no duplication of studies or other projects funded by the Corps and the Environmental Protection Agency or other Federal and State agencies. Corps studies focused on the quantity and flow of water in the Bay rather than on the quality of the water.

This report does not contain any findings or recommendations for corrective action and management comments are not required. The Assistant Secretary of Defense (Acquisition and Logistics) agreed with our conclusion in the draft report that no further audit effort is warranted. His comments, dated July 8, 1986, are at Enclosure 1. Copies of this report will be distributed to the non-DoD activities shown at Enclosure 3.

Please contact Mr. Frederick M. Henderson on 694-3463 or Mr. A. Daniel Wenger on 693-0551 if you have any questions concerning this report. The cooperation and courtesies that were extended to the auditors during the survey are appreciated.

Stephen A. Trodden

Stephen A. Trodden
Deputy Assistant Inspector General
for Auditing

Enclosure

cc:
Secretary of the Army
Secretary of the Navy
Secretary of the Air Force
Assistant Secretary of Army (FM)
Assistant Secretary of the Navy (FM)
Assistant Secretary of the Air Force (FM)
Director, Joint Staff

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WASHINGTON, D.C. 20301-8000

ACQUISITION AND
LOGISTICS

I/EP

8 JUL 1986

MEMORANDUM FOR DEPUTY ASSISTANT INSPECTOR GENERAL FOR AUDITING

SUBJECT: Draft Survey Report on the Audit of the Chesapeake Bay Program
(Project No. 6SA-705)

This is in reply to your memorandum of April 25, 1986, informing me of the results of the draft report on this subject.

I agree with your conclusion that no further audit effort is warranted.

The only comment I would offer is that you include the Senate Subcommittee on Governmental Efficiency and the District of Columbia in Enclosure 2.

Thank you for the opportunity to comment on the draft report.

Jim Wade
James P. Wade, Jr.

ACTIVITIES VISITED OR CONTACTED

Office of the Secretary of Defense

Office of the Assistant Secretary of Defense (Acquisition and Logistics), Defense Environmental Leadership Project, Washington, DC

Department of the Army

Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health, Washington, DC
Headquarters, Army Materiel Command, Alexandria, VA
Aberdeen Proving Ground, Aberdeen, MD

Department of the Navy

Headquarters, Naval Facilities Engineering Command, Alexandria, VA
Naval Facilities Engineering Command, Atlantic Division, Norfolk, VA
Naval Air Rework Facility, Norfolk, Va
Naval Base, Norfolk, Va

Department of the Air Force

Office of the Deputy Chief of Staff, Logistics and Engineering, Bolling Air Force Base, Washington, DC
Langley Air Force Base, Hampton, VA

Defense Logistics Agency

Headquarters, Defense Logistics Agency, Alexandria, VA

State of Virginia

Virginia State Water Control Board, Norfolk, VA
Virginia State Water Control Board, Alexandria, VA
Hampton Roads Sanitation District, Norfolk, VA

State of Maryland

Maryland Department of Health and Mental Hygiene, Baltimore, MD
Maryland Department of Natural Resources, Annapolis, MD
Water Resources Administration, Annapolis, MD

Estuarine Research Federation

Star Route Box 541 Chauvin, LA 70344

June 18, 1986

Senator Charles McC. Mathias, Jr.
Chairman, Senate Subcommittee
on Governmental Efficiency and
the District of Columbia
Washington, D.C. 20510

Dear Senator Mathias:

This is in response to your invitation to Mr. Michael Castagna (on behalf of the ERF) to submit testimony at the hearing on the future direction of the Chesapeake Bay clean up program on June 24.

Mr. Castagna transmitted your letter to me in my capacity as Vice-President of the Estuarine Research Federation. After discussing your invitation with Dr. Jerry Schubel, President of the Estuarine Research Federation, we have decided not to submit testimony for your hearing. I wish to outline the reasons for this decision.

Although Dr. Schubel and I have in the past been active in Chesapeake Bay research, neither of us is abreast of the current status of the clean up program to a degree sufficient to provide a considered response to the questions posed in your letter. Although numerous members of ERF are active in research in the Chesapeake Bay, we suspect that you will be directly soliciting testimony from prominent Bay researchers and institutions.

The Estuarine Research Federation is presently conducting an evaluation of research needs for the Nation's estuaries. Our focus is on estuaries, in general, rather than any specific estuary. The Chesapeake holds a near and dear spot in the hearts of Dr. Schubel, myself and many of our members. The experiences developed in the Chesapeake Bay Program for which you are largely responsible provide a rich resource for the Federation's efforts. We will be certain to provide you with the ERF estuarine research strategy when it is complete.

Thank you for providing the Estuarine Research Federation an opportunity to contribute to your important deliberation.

Sincerely yours,

Donald F. Boesch

Donald F. Boesch, Ph.D.
Vice-President
Estuarine Research Federation

DFB/lmb

June 23, 1986

Honorable Charles McC. Mathias, Jr.
Chairman, Senate Subcommittee
on Governmental Efficiency and
the District of Columbia
387 Senate Russell Office Bldg.
Washington, D. C. 20510-2001

Dear Senator Mathias:

Thank you for your letter of May 29, 1986 inviting me to submit testimony on the future direction of the Chesapeake Bay cleanup program. As you know, the Interstate Commission on the Potomac River Basin continually works toward a cleaner Potomac and thus Chesapeake. Our work program has contained specific elements directed toward the Chesapeake Bay cleanup since the Governors' conference of December 1983. At that conference, the Commission adopted a resolution which "reiterates its support for and cooperation in the implementation of current and future programs for improving and protecting the environmental quality of Chesapeake Bay." A full copy of the Resolution is appended to and forms part of this testimony for the record. ICPRB has played an important role in coordinating and assisting with programs to improve the quality and quantity of water flowing to the Bay.

In particular:

> ICPRB has carried out a long-term trend analysis of water quality data in the Potomac River Basin. This work indicates the location, direction and magnitude of water quality trends in the basin of the second largest tributary to the Chesapeake Bay. Analysis, publication and dissemination of Potomac water quality data and information continues to be a significant activity of ICPRB.
>
> With regard to the Monocacy River catchment area which has been identified as an important source of dispersed agricultural pollutants on erodible soils, ICPRB continues to provide support in an intensive land use / water quality modeling effort. As part of the State/U.S. EPA Potomac

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Strategy Work Program. ICPRB hired and obtained Maryland cooperative funding for staff to work at the Maryland Office of Environmental Programs, where the model is being calibrated and verified. Other ICPRB contributions to the Potomac Strategy Work Program which impact the Potomac Estuary and the Cheaspeake Bay include: the evaluation of benefits of alternate algal concentrations, and the identification of algal species group characteristics and statistical frequency analysis of critical algal conditions as input to the Potomac Eutrophication Model. Results of this modeling effort are expected to provide specific information for targeting point and non-point source pollution abatement programs.

In cooperation with the Maryland Department of Natural Resources - Water Resources Administration, ICPRB has several projects underway in order to identify and evaluate methods for improving freshwater inflow to the Chesapeake Bay. The most fruitful of these involves the analysis of multi-purpose raw water storage in the basin for dynamic flood control, water quality and water supply operations. Other topics include water conservation effects of plumbing codes, Potomac/Patuxent interbasin transfers, off-site evaporative loss of heated water discharges, and long-term changes in rainfall/runoff relationships.

The U.S. EPA Chesapeake Bay Program has requested and received a commitment of approximately 5 months of ICPRB staff time in order to prepare the 1986 Monitoring Report and Summary. This task will involve writing and rewriting integrated summaries of Program scientific research work, design and layout, editing, and proofing the material.

ICPRB has been an active participant in the Section 208 River Basin Water Quality Management Planning process. The State of Maryland has concentrated its recent review of basin 208 Water Quality Management Plans in areas which drain to the upper and middle portions of the Chesapeake Bay. We believes that 208 Planning is an established process which has not realized its potential for water quality control with respect to the Chesapeake Bay. It has become apparent that more focused and stringent water quality planning goals should be encouraged and adopted. However, it is even more apparent that with the present (and foreseen improvements to the) state water quality regulatory framework, more effort is required in the setting and enforcement of pollution discharge limits. There is a clear opportunity for a Federal role in assisting and supporting the states in their significant efforts to date directed toward setting, monitoring and enforcement of discharge limits.

ICPRB can only continue to carry out its important work on improving water quality in the Potomac Estuary and the Chesapeake Bay with the support of the Interstate Compact signatories: Pennsylvania, Maryland, the District of Columbia, Virginia, and West Virginia, as well as the Federal government. In addition an important and threatened source of support is the Clean Water Act Section 106 grants to states and interstate agencies for river basin water quality planning and other water pollution control activities. These programs of support should continue at present or higher levels if ICPRB and the states are to proceed with their work successfully in phase II of the Chesapeake Bay cleanup program.

Sincerely,

Paul W. Eastman, P.E.
Executive Director

Enclosure:

RESOLUTION

Approved: December 6, 1983

WHEREAS,

The U.S. Environmental Protection Agency (USEPA) in 1983 completed a study of Chesapeake Bay to assess the principal factors causing the decline of the environmental quality of the Bay and to determine how it can be improved and protected.

The single most important conclusion of the USEPA study is that Chesapeake Bay's biological resources are in decline and excessive availability of nutrients is the primary cause.

The Governors of Maryland, Virginia and Pennsylvania, the Mayor of the District of Columbia, the Chesapeake Bay Commission (a bi-state commission of the General Assemblies of Maryland and Virginia), and the USEPA have convened a conference on December 7, 8, and 9, 1983, to develop a strategy for regional management of Chesapeake Bay to assure protection and enhancement of the Bay's living resources.

The most important preparatory activity for the conference consisted of five workshops (Habitat Management, Land Activities, Water Use Activities, Fisheries Management and Monitoring) charged with the responsibility of recommending appropriate governmental responses to current studies and reports about the Bay. The most important recommendations of the workshops call for the reduction of nutrient loadings to the Bay.

The Potomac River is the second largest tributary of Chesapeake Bay and the tidal Potomac is the largest of the eastern and western shore arms of the bay system.

The Interstate Commission on the Potomac River Basin (ICPRB) was created by the States of Maryland and West Virginia, the Commonwealths of Pennsylvania and Virginia, and the District of Columbia (the signatories) under an interstate compact, amended in 1970, which was approved by the U.S. Congress. The function of the ICPRB, composed of members appointed to represent the signatories and the federal government, is to support and coordinate "the activities of the federal, state, local and private agencies, groups, and interests concerned with the development, utilization and conservation of water and associated land resources" of the Potomac basin.

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Since 1969 a cooperative program among federal, state and local agencies has resulted in significant progress in the improvement of the environmental quality of the waters of the Potomac basin, especially the tidal river in the Metropolitan Washington region, through nutrient and other pollution control strategies. This progress and continuing implementation of nutrient control strategies are and can continue to be a valuable prototype for Chesapeake Bay as a whole.

The water quality regulatory agencies of Maryland, Virginia and the District of Columbia, the Metropolitan Washington Council of Governments, and the ICPRB have underway a continuing program of assessing progress and implementing strategies for further improvement of the environmental quality of the Potomac tidal river and estuary, particularly on the subject of nutrient effects and control from both point and nonpoint sources.

The ICPRB and others have work currently underway to determine the relative importance of nutrient contributions from the Potomac basin which is vital to cost effective implementation of nutrient control strategies for the Potomac and Bay as a whole.

The ICPRB's technical, educational, and coordination capability and experience are valuable assets available to all concerned with the Bay, of which the Potomac is a vital part.

THEREFORE, the ICPRB

1. reiterate its support for and cooperation in the implementation of current and future programs for improving and protecting the environmental quality of Chesapeake Bay,

2. urges the Chief Executives of the State governments and the District of Columbia, together with the State legislatures, the USEPA, other federal agencies, and other organizations concerned, to develop implementation priorities and plans based on the Chesapeake Bay workshop and conference recommendations,

3. offers to take a lead role immediately in coordinating and assisting with these activities in the Potomac basin as a prototype for such activities needed for the Bay as a whole, and

4. directs the ICPRB Chairman and staff to give first priority to carrying out the intent of this resolution.

THE IZAAK WALTON LEAGUE OF AMERICA

TESTIMONY FOR THE RECORD

ON

THE FUTURE OF THE CHESAPEAKE BAY PROGRAM

BEFORE THE

SENATE COMMITTEE ON GOVERNMENTAL AFFAIRS

SENATE SUBCOMMITTEE ON

GOVERNMENTAL EFFICIENCY AND THE DISTRICT OF COLUMBIA

Submitted by:

The Izaak Walton League of America

June 24, 1986

National Office: Suite 1100, 1701 N. Fort Myer Drive, Arlington, Virginia [illegible] • Phone [illegible]

June 24, 1986

Dear Chairman Mathias and Members of the Senate Subcommittee on
Governmental Efficiency and the District of Columbia:

Thank you for this opportunity to submit testimony for the record concerning the future direction of the Chesapeake Bay Program.

The Izaak Walton League of America is a national conservation organization dedicated to defending the earth's "Soil, Air, Woods, Waters and Wildlife." The preservation and restoration of the magnificent Chesapeake Bay ranks as one of the League's top priorities. As stated by Richard Vander Horn, Chairman of the IWLA's (Izaak Walton League of America) Executive Board:

"The Chesapeake Bay is one of the last great unprotected resources of this nation. It is as important to the people of America as any part of our National Park system -- and it must be saved for current and future generations."

In order for the Chesapeake Bay to be saved, it is imperative that the cleanup program continue as a cooperative effort in the spirit of the Chesapeake Bay Agreement. The Bay Agreement of 1983 called for the preparation and implementation of coordinated plans to improve and protect the water quality and the living resources of the Chesapeake Bay. If this coordinated effort is to continue throughout the proposed Phase II Implementation Program it is vitally important that the federal government support the Bay effort beyond 1988. The IWLA would like to take this opportunity to comment on the future of the Bay program by addressing a few of the questions posed in Senator Mathias' letter of May 29, 1986.

FEDERAL ROLE IN THE BAY RESTORATION

The federal government has played an integral role in the development of the program to save the Chesapeake Bay. Since the signing of the Bay Agreement in 1983, the cooperative effort among the states and government agencies has appropriately expanded to include Memoranda of Understanding with: Soil Conservation Service, Corps of Engineers, Department of Defense, Fish and Wildlife Service, National Oceanic and Atmospheric Administration and the U.S. Geological Survey. This joint effort has been responsible for accomplishing Phase I of the Bay Restoration and Protection Program. The government, state agencies and citizens involved in Phase I agreed on an overall purpose for the Bay restoration and goals and objectives for controlling: nutrients and toxics, protecting and restoring the Bay's living resources, addressing other related matters and supporting a cooperative approach in managing the Bay.

The Phase II Implementation plan is a logical progression towards accomplishing the goals outlined and addressed in Phase I. The detailed eight step program of Phase II proposes to "build on the logical development of water quality management programs of the past, adding scientific and technological information and emphasis on living resources improvement." A necessary component or rung on the proposed eight step building ladder is the federal government's participation. Without the technical and financial support of the federal government, Phase II will have great difficulty advancing beyond Step 1 -- "Specifying uses desired for the Bay and Tributaries."

One area where the federal government can, and should assume the lead, and serve as a role model to state and local governments, is strengthening and enforcing water quality regulations. The Chesapeake Bay is seriously impacted by industrial waste and municipal sewage. The National Pollution Discharge Elimination System (NPDES), is riddled with flaws:

- The permits do not restrict toxic wastes, they only limit common pollutants.
- The discharge limits are based on what is affordable, not what is necessary for water quality improvement.
- Enforcement has been weak, practically non-existent.
- Federal facilities ignore the permit system.
- The system is being manipulated -- industrial wastes are sometimes sent to public sewage plants.

It is painfully obvious, that, not only in the Bay watershed, but throughout the country, the existing permitting system established by the Clean Water Act is antiquated, inefficient and ineffective. Environmental officials in charge of federal facilities should set an example to states and localities by forcing the military to abide by the law. Industries and municipal plants must be forced to comply to their discharge restrictions. Without tougher water quality regulations and discharge enforcement, any efforts to clean and restore the Chesapeake Bay will have little chance of succeeding. The federal government should take the lead in Step Two of the Phase II Implementation Plan -- "Define water quality and habitat criteria to support the uses desired for the Bay and its tributaries."

IZAAK WALTON LEAGUE OF AMERICA'S CHESAPEAKE BAY PROGRAM

Regardless of the status and re-authorization of the federal Chesapeake Bay Program, the Izaak Walton League of America plans to continue its involvement in the effort to restore the Chesapeake. The current IWLA Bay restoration projects include:

* Annual Chesapeake Bay Conservation Stamp, a series of eight conservation stamps and limited edition prints sold nationwide with all profits awarded as grants to local Bay clean up projects.

* Chesapeake Bay Conservation Awards, cosponsored by the Du Pont Company, annually recognizes groups and individuals who have played outstanding roles in the fight for the Bay restoration.

* Public Service Announcements, "Bay Alerts!", inform citizens how they can help save the Bay from their own homes and become "water quality conscious".

* The Bay is Your Business Mini-Conferences encourage business involvement in the Bay clean up effort.

* Wetlands Watch encourages citizens and community groups to adopt and protect wetlands in their area.

* Save Our Streams (SOS) Program, urges citizens and community groups to "adopt a stream" and work for its protection.

Because the IWLA Bay projects focus on public participation and education, and attempt to complement other organizations and groups Bay activities, IWLA's projects can easily be integrated into Phase II of the Restoration and Protection Program. As the Phase II program works through the eight step process, the League's programs would reflect that progress and any changes in the focus of the Bay cleanup. The League's Awards ceremony and Public Service announcements are ideally suited to highlight the implementation of Phase II.

In addition to the IWLA's current national Bay programs outlined above, the League's Pennsylvania, Maryland and Virginia Divisions are significantly involved in their state and local Bay and Bay related programs and initiatives. A few of their recent efforts include:

* The IWLA members of the Maryland Division successfully lobbied for passage of the landmark Maryland Critical Areas Legislation which was recently signed by Governor Hughes.

* For the past three years the members of the Virginia Division have actively lobbied for a ban on phosphates, and are currently preparing to promote passage of S.248 this January in the Virginia legislature.

* The York, Pennsylvania IWLA Chapter has received recognition and funding for their stream cleanup efforts along the Cordorus Creek which flows into the Chesapeake, via the Susquehanna River.

The involvement and activities of the IWLA membership at the state and local level will continue to focus on Bay restoration and the IWLA will continue to provide citizen input and support throughout the Phase II Implementation Program. In order to ensure that the Phase II efforts thoroughly address the future needs of the Bay cleanup, the IWLA recommends that there be ample opportunity for citizen involvement and review, beyond the already existing Citizens Advisory Council (CAC), during each of the eight steps outlined in the program.

CHESAPEAKE EXECUTIVE COUNCIL

The Chesapeake Executive Council (CEC) has done an commendable job in overseeing the implementation of the Bay restoration and protection plans. CEC along with the Implementation Committee and the Chesapeake Bay Liason Office form the basis for a regional management structure. This structure is necessary in order to guarantee a cooperative approach for the environmental management of the Bay. This existing management structure along with citizen input by CAC and others will provide the needed base to institute the Phase II Implementation Plan.

With over 400 citizens groups, countless local, state and federal entities, watermen, businesses, industry and others working to save the Chesapeake Bay, it is appropriate and necessary to have one recognized lead organization coordinating the effort. The Chesapeake Executive Council could fill that role. The Chesapeake Bay cleanup would receive a real boost if the CEC became the respected lead organization in the Bay restoration effort. If CEC met more than twice a year and had the authority to offer, suggest and institute binding decisions and recommendations affecting the entire Bay region, the Bay would benefit. Obviously, some of the problems effecting the Bay can only be addressed at the state or local level. There are, however, some issues and problems which could be handled by a stronger CEC. For example, the CEC might commend the state of Maryland for passing the Critical Areas Act and recommend that other states follow Maryland's lead. CEC could "encourage"

Virginia to follow Maryland and the District of Columbia's lead and institute a phosphate ban. A more powerful CEC would be able to promote a uniform regional Bay cleanup program and ensure an efficient and timely completion of the Phase II Implementation plan.

Thank you for this opportunity to comment on the future of the Chesapeake Bay Restoration and Protection Program. The Izaak Walton League of America looks foward to working together with the Bay Community to ensure the protection and long-term vitality of the Chesapeake Bay.

Sincerely,

Cynthia D. Shogan
Chesapeake Bay Coordinator

THE IZAAK WALTON LEAGUE OF AMERICA
INCORPORATED

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p. 119

Testimony for the Record on
The Future Direction of the Chesapeake Bay Cleanup Program
United States Senate
Committee on Governmental Affairs
Subcommittee on Governmental Efficiency and the
District of Columbia
Charles McC. Mathias, Chairman
June 24, 1986

National Office Suite 1100, 1701 N. Fort Myer Drive, Arlington, Virginia 22209 • Phone 703 528 1818

Senator Mathias and Senate Subcommittee on Governmental Efficiency and the District of Columbia:

As an officer of the Izaak Walton League of America, I appreciate the opportunity to have these comments considered in the deliberations of the Chesapeake Bay's future. My remarks primarily relate to the last question in Senator Mathias' letter dated May 29, 1986. They are basic requirements for final solutions.

It has been 64 years since the Outdoor Writers conceived of the Izaak Walton League as a conduit to educate the public. Our chapter is predicated on education and research.

The exploitation of our air and free flowing waters in the name of national growth and employment has about reached the point of no return. We have opened "Pandora's Box" to realize that hazardous chemicals, while adding to our citizens' comfort, are limiting our chances of survival.

The toxics and pollutants released into our atmosphere and the toxic and erosion pollution carried and distributed in our streams are quickly poisoning much potable water necessary for mankind's existence.

Both our ozone and our water are limited, they are to a great extent self revitalizing. However, our misuse is lowering that quantity gradually but surely, unless we can reverse the action.

To reverse the debilitating effects of pollution, there are certain intrinsic attitudes we must also restore to the consciousness of all of our citizens.

Under your mandate and direction of administration/official agencies, we must:

1-- Arouse the American Conscience. Acknowledge that we are aware of the causes and results of our actions and accept these results as steming from our actions.

2-- Revive the American Pride in our country. It must be imprinted in the minds of all of our citizens that they are the cause and the cure. Those in America's mad, blind, headlong rush towards the accumulation of the greed for gold may defend their positions. The least they could do in compensation of their use of all peoples' resources is to set the example of Pride in protecting America's natural resources and help replenish them for future generations. The corporate entities are the management persons, not inhuman citadels of power. (And this is no statement against the "American Dream", rather it is calling attention to their ruthless methods to reach unrealistic , excessive destruction of our country's wealth in resources.)

3-- We need to rediscover the right and rededication to our responsibilities for each of our acts. It should be on a single citizen basis, carried through in all facets of use of our life-giving assets in our daily actions.

4-- And finally, we need to rededicate and acknowledge the meaning of our Oath of Allegience to our country, in all walks of life, for all reasons that we wish to remain in the United States of America.

These qualities, principles and actions can be reinstituted, learned and reinforced by public and institutional education. It is up to your Subcommittee to determine (and fund) the proper Agency to handle it and to start the process.

My second observance and request is that of enforcement by the Environmental Protection Agency (EPA) and corresponding State agencies. Those in enforcement must necessarily act within the present laws. States and Agencies have shamed the U.S. Government by refusing to accept the laws of Congress. Certainly there could be realistic plans, temporary stopgaps, and a proof of faith in meeting their obligations within a realistic (not foot-dragging) time frame. From now on out, exceptions should be outlawed.

Thank you for the opportunity to present these comments to you. I would appreciate a copy of your recommendations when an agreement is reached.

Gladys L. Harris

National Treasurer

Izaak Walton League of America

(home) 308 Kerfoot Avenue

Front Royal, VA. 22630

June 20, 1986

LOWER JAMES RIVER ASSOCIATION
P.O. Box 110
Richmond, Virginia 23201
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June 30, 1986

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Patricia A. Jackson
Executive Director

The Honorable Charles McC. Mathias, Jr.
Chairman, Senate Subcommittee
on Government Efficiency and the
District of Columbia
Washington, D.C. 20510

Dear Senator Mathias:

Thank you for the opportunity to submit comments for consideration by the Senate Subcommittee on Governmental Affairs and the District of Columbia on the future direction of the Chesapeake Bay Cleanup Program.

The Lower James River Association is a non-profit citizens' conservation organization dedicated to the preservation of the environmental, scenic, historic and recreational characteristics of the tidal portion of the James River, consistent with orderly economic development. We have over 700 members, most of whom are riparian landowners on the James.

Since the James River is the largest tributary to the Chesapeake Bay in Virginia and it serves as a valuable habitat for living resources of the Bay, we have a significant interest in the cleanup and restoration of the Bay. We provide public education about Bay issues, and participate in several advisory committees which recommend policies to improve the Bay and its tributaries.

In response to your specific questions regarding the future of the Bay Program, we have the following comments:

1. Since the Chesapeake Bay is a vital natural resource of national significance, the federal government should continue to be involved in the Bay restoration effort beyond 1988. The U.S. Environmental Protection Agency (EPA) provides coordination of the Bay monitoring program, research, data base management, and public participation. These important functions tie the states' efforts together and keep information flowing in both directions. There is also an opportunity for citizen involvement and education about the Bay.

EPA should continue the role of coordinator of these Bay management functions. The data collected by various sources (federal, state, local, individual) must be put into one system to be useful in properly evaluating the state of the Bay, the need for additional work, and to measure the level of improvement. This function is best served by EPA.

With the establishment of a significant data base and reliable computer models, EPA can assist the states in identifying target pollutant load reductions and alternative pollution control strategies. They can help establish a relationship between specific goals for improving the Bay and the strategies necessary to achieve those goals. EPA should also assist the states with funding for acceptable pollution control strategies.

A strong public education program is very important to continue the Bay cleanup over the long-term. To be effective, this program should be carried out at the federal, state and local levels. The federal government should continue their efforts in this program.

We would agree that there is a need for a Bay re-authorization bill beyond 1988, which should provide for at least the current level of funding for federal coordination of the Bay Program. Additional funds would be useful to develop predictive computer models, to publish periodic updates on improvements in the Bay, to increase public participation and education efforts, and to provide financial assistance to state and local governments to implement pollution control programs.

2. Phase II of the implementation stage will apparently focus on translating goals from the Chesapeake Bay Restoration Plan into specific pollutant load reduction strategies and identifying programs and policies to achieve those goals. In Virginia, this will involve focusing on the river basins that make up the Bay system.

   The Governor has appointed members to several River Basin Committees to focus on the application of Chesapeake Bay Initiatives within specific basins. These committees will advise the Governor and the new Secretary of Natural Resources on priority issues for each river basin. For example, on the Lower James River, nutrients from point sources are a greater problem than from non-point sources. This would require more emphasis on point-source controls, whereas the Rappahannock River would probably need more non-point source controls to reduce nutrient loadings. Our Association will continue participation in the Lower James River Basin Committee to help focus attention on problems unique to the James.

In addition, the Chesapeake Bay Commission has established a Land Use Roundtable in Virginia to address the issue of land use decisions affecting the water quality and living resources of the Bay system. Our Association will continue to participate in this Roundtable.

As Phase II of the Cleanup Program proceeds, there will be more need to coordinate the various initiatives, programs, and results to see how all of these efforts fit together to achieve the goals of the Bay Restoration Plan. Our Association will play a part in this process relative to the James River. Specifically, we will support nutrient and toxic control strategies for the James River. We will also continue our support of a phosphate detergent ban in Virginia. We will continue working with the local governments in our area to address the effects of land use decisions on the quality of the James River and the Bay. We will also continue our support of fish restocking programs, development of management plans, and habitat improvements. Our public education program will continue, as well, including our active participation in the citizen monitoring program sponsored by the Citizens' Program for the Chesapeake Bay.

With respect to federal funding to accomplish these objectives, we would hope that funds will be available to develop nutrient and toxic control programs in the states and to assist the states and localities with land use policies that will help protect the Bay. We would also support continuation and expansion of the Citizens' Monitoring Program, which is an excellent opportunity for individuals to be directly involved in the Bay cleanup effort. It also provides a wonderful opportunity for public education. This program should be available on all of the river basins in the Bay system.

We would also support the continuation of funding for the U.S. Fish and Wildlife Service to carry out their cooperative agreements with Virginia and Maryland for restocking anadromous fish species, such as striped bass, in the Chesapeake Bay. This is an important program for restoration of these species in the Bay system. The federal fish hatcheries involved in this program should also receive adequate funding to continue their operations. We are particularly interested in seeing repairs completed at the Harrison Lake Fish Hatchery in Charles City County, and continuation of that operation devoted primarily to striped bass.

3. With regard to implementing specific nutrient-reduction goals, the Commonwealth of Virginia established tentative goals to reduce phosphorus loadings to 20% below 1980 levels and to

maintain nitrogen loadings at 1980 levels, based on the Chesapeake Bay Program results. Unfortunately, these goals have not been achieved, and phosphorus and nitrogen loadings have continued to increase.

Nutrient reduction strategies should be developed by the states, with EPA's assistance. Specific nutrient-reduction goals should be determined for each river basin. These goals can be established by drawing a relationship between chlorophyll levels in the rivers and the phosphorus and nitrogen which provide enriched conditions for algal growth.

While specific water quality standards are being developed for each river basin, there should at least be a commitment to prevent any increases in nitrogen and phosphorus loadings to the rivers and the Bay. Management strategies to curb increased loadings of nitrogen and phosphorus should be implemented.

We support a two-phase approach to controlling point sources of nutrients, which predominate on the Lower James. First, a phosphate detergent ban should be adopted by Virginia, compatible with those bans implemented in Maryland and Washington, D.C. Second, nutrient controls should be put into place at sewage and industrial treatment plants that contribute large loads of nitrogen and phosphorus to Bay tributaries.

Municipal and industrial plants should be encouraged to use biological nutrient removal, where feasible. Planning should begin now to identify where these controls will do the most good.

For non-point source controls on nutrients, we support more extensive implementation of Best Management Practices in urban and agricultural areas. We support the elimination of combined sewer overflows, which contribute nutrients as well as bacterial contamination. Additional education and financial incentives will be necessary to address these problems.

4. As far as new initiatives to supplement the Phase II action plan, emphasis should be placed on nutrients and toxics controls. Water quality standards should be developed for controlling heavy metals, organics, nitrogen and phosphorus discharges to the Bay system. Discharge permit limits should be established for point-source discharges of these pollutants, the limits should be strictly enforced, and control technologies should be implemented according to acceptable schedules.

Specific goals to improve fish and shellfish populations should also be established, so that we have a positive way to measure our success in cleaning up the Bay.

Public education and participation should be increased significantly. We all need to appreciate the relationships of our individual and collective activities on the water quality and living resources of the Bay. Once we understand these relationships, we can take appropriate corrective actions.

5. Phase II should address the protection of the living resources of the Bay and their habitats. Specific pollutant-load reduction goals must be established and met to improve water quality to a level suitable for the survival of living resources in the Bay. At the same time, fisheries management plans should be developed to identify programs for the protection of important aquatic species. Restocking programs and the elimination of physical barriers in spawning areas should be continued to enhance the population of anadromous fish. Wetlands protection and the re-establishment of submerged aquatic vegetation should be part of a habitat protection program. Efforts to curb overfishing of certain species should be continued until their populations are adequately re-established in the Bay again.

   Cooperative efforts between the federal government and the states to carry out these programs should be continued and expanded. The health and survival of the living resources of the Bay will determine the success of the cleanup program.

6. The problem of toxic substances in the Bay must be given additional attention in Phase II. The current issue of tributyl tin use on boat hulls throughout the Bay exemplifies the pervasiveness of the toxic problems.

   We are keenly aware of the long-term effects of toxics on the James River, specifically due to the continued ban on commercial fishing of certain species with Kepone levels above the FDA action level over ten years after discharges of this substance have ceased. Additionally, the Elizabeth River, a tributary to the James, is one of the two most heavily polluted areas in the entire Bay system due to toxic substances.

   More emphasis on toxics monitoring and controls should be given in Phase II of the Bay cleanup. The federal government should assist the states in establishing water quality standards for heavy metals and organics. Additionally, specific toxic reduction strategies should be identified and implemented through permits and pretreatment programs for point sources, and BMP's for non-point sources.

7. It appears that the management structure of the Executive Council, Implementation Committee, and Advisory Committees (Citzen, and Science and Technical) is sound. Our recommendation of improvement would be that these groups coordinate their efforts with local governments, individuals, and public interest groups.

   Regular progress reports and news stories on the improvement of the Bay will provide additional incentives for individuals to do their part to continue the cleanup efforts. Local governments should be more involved in the cleanup program, especially since their decisions on land use issues, erosion control, wetlands management, sewage treatment operations, etc. will have a significant impact on the Bay system. Their input and feedback is essential to a successful Bay management program.

   Several public interest groups provide public education and participation on issues directly related to the Chesapeake Bay. We should be kept well-informed on the status of the Bay Program, so that we can pass this information along to the general public.

8. Greater local government participation in the Bay cleanup program should be encouraged by the federal and state governments. As stated previously, the decisions made by local governments significantly impact the Bay and its tributaries. They will need assistance in finding ways to accomodate local population growth and development, while, at the same time, doing their part to protect the Bay.

   Management strategies for specific river basins in the Bay must address the role of local governments, and provide for significant input from the localities in their development. Examples of good local plans and decisions which have been made within the Bay region should be well-publicized and established as models for other localities. In Virginia, local governments are well-represented on the Chesapeake Bay River Basin Committees.

   Financial and technical assistance should be available to the local governments for the incorporation of Bay protection strategies within their local plans, for building and upgrading sewage treatment plants, for enforcing erosion and sediment control ordinances, for operating local wetlands boards, for inspecting septic tank-drainfield systems, for incorporating best management practices, for enforcing pretreatment programs, etc. With sufficient information and financial assistance, local governments can contribute significantly to the Bay cleanup program.

We sincerely appreciate the opportunity to comment on Phase II of the Bay program. We commend your efforts and those of all participants in the cleanup program for the wonderful job that you are doing. We wish you continued success.

Sincerely,

Patricia A. Jackson

Patricia A. Jackson
Executive Director

WRITTEN TESTIMONY SUBMITTED TO THE SENATE GOVERNMENTAL AFFAIRS SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY AND THE DISTRICT OF COLUMBIA

BY RICHARD N. JARMAN, EXECUTIVE DIRECTOR
MARYLAND SEA GRANT COLLEGE PROGRAM

JUNE 24, 1986

I appreciate the opportunity to provide the following remarks to the Subcommittee on Governmental Efficiency and the District of Columbia regarding future directions of the Chesapeake Bay cleanup program. I wish to thank the Subcommittee and especially Senator Mathias on behalf of the Maryland Sea Grant College Program for the leadership and support given to the Chesapeake Bay Program and programs like the National Sea Grant College Program that contribute to the wise use and management of marine and estuarine resources.

The Maryland Sea Grant College Program has a long standing involvement with issues associated with the use and management of Chesapeake Bay resources. With the first program grant to the University of Maryland in 1977, Maryland Sea Grant has focused its attention on research and education activities that contribute to realizing the potential of the Chesapeake Bay. As one of the programs of the National Sea Grant College Program of the National Oceanic and Atmospheric Administration (NOAA), Maryland Sea Grant is charged with enhancing the wise use and management of the nation's marine and coastal resouces through a coordinated program of research, education and extension. Sea Grant, like the Chesapeake Bay Program, is based on the concept that a partnership among federal and state government, industry, academia and the public is the most productive approach for improving beneficial use of the nation's marine and coastal resources. The federal involvement in Sea Grant through funding, program coordination and national review provides the continuity and integration necessary to sustain the long-term effort required for pursuing the national interest in marine and coastal resource use. State and local government and industry, similarly, are called on to support the national interest in marine and coastal resources by providing funds and participating in the identification of priority problems and opportunities. In addition to providing financial support, the academic partner in Sea Grant brings the research and education talent and expertise essential for defining and pursuing the complex scientific questions that must be answered in order to advance the management and development of marine and coastal resources. Sea Grant's success is the result of the partnership approach which emphasizes the strengths and capabilities of each partner. Equally as important to Sea Grant's success is the commitment to a long-term, sustained effort that emphasizes relevance and excellence. It is from the perspective of Sea Grant's approach and role that I have addressed the subject before the Subcommittee. My comments emphasize the importance of maintaining an active partnership among all the interests in the Chesapeake Bay that is founded on a long-term commitment. Specifically, I wish to stress the need for a continuing effort to develop scientifically sound information that can be used in addressing the complex problems facing the Bay.

The federal government will have an important ongoing role to play in ensuring the continued acquisition and availability of scientific information that can be used in addressing the problems of the Bay. The federal government is uniquely positioned to support research and data collection that applies Bay-wide. The living resources and environmental processes of the Bay do not recognize state boundaries and actions taken at the state and local levels should be viewed from a Bay-wide perspective. Similarly, to maximize the return of the federal investment the knowledge gained from other estuaries should be used in the Chesapeake Bay just as the understanding about the Bay should be applied elsewhere. It will be extremely important for federal involvement in the maintenance of a broad based, long-term effort to underpin the Bay cleanup with research and technical information. A coordinated, targeted federal effort on the Chesapeake Bay will likely require a continuing Bay Program authorization to emphasize the established national interest in the Bay and to provide the guidance for bringing together the various agencies that can contribute to the Bay effort. Any Bay Program reauthorization should clearly recognize the contributions and programs throughout the federal government that are relevant to the Bay.

The strength of Sea Grant lies in the ability to define and address the scientific questions associated with the Bay's problems. Also, the established partnership with the federal government facilitates the development of Bay-wide coordinated programs. An example of how Sea Grant can respond is an ongoing research effort between the Maryland and Virginia Sea Grant Programs. With cooperation and support from the Estuarine Programs Office and the Office of Sea Grant, NOAA, the Maryland and Virginia Sea Grant Programs identified a multi-state team of university experts who developed a broad based in-depth program to examine the underlying mechanisms and living resource impacts of anoxia/hypoxia in the Bay. This ongoing program is a part of NOAA's contribution to the overall Bay effort. Sea Grant has been able to respond because of its ability to draw upon the needed expertise that exists in the region's academic institutions without regard to state boundaries or institutional affiliations. Sea Grant will continue to use this approach in working with federal and state decision makers as well as incorporating the management issues of the Bay effort in formulating Sea Grant's ongoing research, education and extension programs. Sea Grant's participation and contribution is contingent on continued federal involvement in the national Sea Grant College Program. The federal funds obtained through the competitive Sea Grant process are critical to sustaining Bay related activities. However, the Reagan Administration has repeatedly attempted to eliminate the federal investment in Sea Grant and the level funding provided by Congress has resulted in a steady erosion of Sea Grant's capabilities. Funding at the authorized level for the National Sea Grant College Program would substantially improve Maryland and Virginia Sea Grant's participation in the Bay program. The federal Sea Grant dollars, however, will need to be enhanced. This can be accomplished by ensuring that Sea Grant and the academic community in general have the opportunity to compete on the basis of scientific quality and relevance for available federal funds.

The ability of federal and state decision makers to initiate long-term research and technical support studies will be extremely important in supporting management actions. An initiative within the Bay program targeted to research and technical support would greatly enhance the overall Programs effectiveness. A key feature of such an initiative would be the flexibility to address a full array of issues in a coordinated fashion.

The relationship of habitat quality and quantity to the abundance of the Bay's desirable living resources is an important factor in decisions for the Bay's restoration. The EPA Restoration and Protection Plan identified the need to establish cause and effect relationships between habitat condition and resource quality and abundance. To address these concerns research will be needed to examine the natural processes affecting living resources and how natural and man-induced pertubations such as toxic chemicals, sedimentation, physical alteration and storm events affect habitat/living resource relationships. It will be necessary to approach these issues with a long-term, stable funding base. A level of support near $500,000 - $1 million per year for five years would permit substantial progress to be made.

I thank the Subcommittee again for the opportunity to comment on future directions for the Bay Program. I have focused my remarks on those topics of particular relevance to Maryland Sea Grant's participation in the Bay program. The Chesapeke Bay Program stands as an outstanding example of the accomplishments that are possible through cooperative and dedicated action. All those involved are to be congratulated. The Maryland Sea Grant Program will continue to participate to the full extent possible and I look forward to an even brighter future for the Chesapeake Bay.

Testimony of Joseph A. Mihursky
to
The U. S. Senate Subcommittee on Governmental
Efficiency and the District of Columbia
Hearing
on the Future Direction of the Chesapeake Bay
Clean up Program, 24 June 1986

Thank you, Senator Mathias, for the opportunity to comment on this matter. My name is Joseph A. Mihursky, I am a citizen of Maryland, a professor of ecology at the University of Maryland's Center for Environmental and Estuarine Studies. I have been doing research, publishing and lecturing on the Chesapeake System for nearly 25 years.

First, I wish to commend you for your tremendous leadership and foresight in enabling this Chesapeake national experiment to occur. We will all miss your presence. Consequently, as a long time bay watcher, I am concerned that we maintain necessary legislative leadership in the coming critical years. In coastal environmental matters, the power of the political process was never more evident than in this Chesapeake venture. This process must be maintained. The Chesapeake clean up is expected to be a long-term, and possibly continuing, activity. Federal presence and leadership is necessary beyond 1988, not only for financial support, but also for necessary federal agency presence in this multi-jurisdictional 64,000 square mile watershed.

In general, I feel that many, if not all of the initiatives, actions and institutionalizations are proceeding in correct directions. Given proper time and continued effort, efficiencies and effectiveness should improve.

I do have a few major immediate concerns.

One, there is a growing body of knowledge that nitrogen may be a more important nutrient requiring regulation than originally thought. This nutrient should receive additional research and management attention.

Two, the toxics program is underfunded. We must do a better job in understanding the distribution of toxics in the Bay system; factors that effect bioavailability of these materials, and their effects on growth, reproduction and behavior on key Bay organisms.

Third, unlike the reasonably well coordinated and on-going Bay wide water quality monitoring program, the living resources element has been moving more slowly. Perhaps understandably so. We must make sure that this latter element is fully supported, operational and coordinated on a Bay wide basis.

Fourth, there is a vast amount of new data being collected within the Bay system. Good management and regulatory decisions are best made correctly on the basis of good data that are properly analyzed, synthesized and interpreted. I strongly believe that we need more support for data management and interpretation. Indeed, there is a strong argument that we should create a "situation room", or "war room", where an appropriate group of individuals, can have access to real time data, data display and interpretation in order to assist directly in confirming the "goodness" of existing policy, altering existing policy, or establishing new policy. We have pieces of such a concept in place, but we have not gone far enough in support, hardware, software and personnel to achieve a real "situation room" operation. This national experiment is too important for us, as a society, to not maximize this element, as it is critical in assuring efficient and correct judgments.

VIMS
THE COLLEGE OF WILLIAM AND MARY
VIRGINIA INSTITUTE OF MARINE SCIENCE
SCHOOL OF MARINE SCIENCE

23 June 1986

Honorable Charles McC. Mathias, Jr.
Chairman, Senate Subcommittee
on Governmental Efficiency and the
District of Columbia
Washington, D. C. 20510

Dear Senator Mathias:

Thank you for providing me with an opportunity to submit testimony for the record on the future direction of the Chesapeake Bay cleanup program.

I am the Director of the Virginia Institute of Marine Science (VIMS) and the Dean of the School of Marine Science (SMS) of the College of William and Mary. VIMS/SMS is the largest research and graduate education program in the Chesapeake Bay region and is an institute which directs its activities solely to estuarine and coastal problems of the Chesapeake Bay and adjacent coastal waters. The VIMS/SMS annual budget for research and advisory services is approximately $11 million. My perspective in reviewing the issues raised in your letter is that of director of a program mandated by the Code of Virginia to conduct research and advise on problems facing Virginia's Chesapeake Bay resource managers.

1. The federal government plays a very important role in Bay restoration. Each of the state governments (and the District of Columbia) has a vital interest in the Chesapeake Bay. Many of the individual state goals and objectives for restoration of the Bay are similar. The priority each of the states places on achieving each goal or objective may, however, differ. The most important federal role is to assist in developing a coordinated approach that is acceptable to each of the states which may not necessarily follow each individual state's list of priorities.

   I believe a reauthorization bill is important beyond 1988. The coordinated state-federal approach to Chesapeake Bay restoration and management is serving as a model for coordinated management programs elsewhere in the nation. Failure to continue a viable Chesapeake Bay restoration program at the federal level will impact adversely both in the Chesapeake Bay areas and other coastal areas where programs are being developed.

Gloucester Point, Virginia 23062 (804) 642-7000

The specific form of the reauthorization is not as important as maintaining a full federal partnership including mutual financial commitments as is occurring with the present authorization.

2. Regardless of whether or not there is a reauthorization bill, VIMS will continue to provide scientific and technical advice to Virginia's managers of Chesapeake Bay resources and will work through regional entities such as the Chesapeake Bay Commission, Chesapeake Research Consortium, the Citizens Program for the Chesapeake Bay and other Bay-wide organizations which have an identity independent of the "Chesapeake Bay Program." In this manner, VIMS will continue to provide an appropriate Bay-wide scientific and technical perspective.

Federal funding of the stock assessment and water quality monitoring activities conducted by VIMS will be necessary to continue these activities at the increased levels necessary to provide a focus for Phase II activities.

3. Specific interim nutrient-reduction goals can be developed that would be appropriate for implementation next year. It must be stressed that at this time only interim reduction goals are appropriate. The overwhelming evidence of higher than historic nutrient loadings and the present state of depressed living resources strongly support activities designed to reduce nutrient loadings.

The direct quantitative relationship between nutrient loadings and living resource stock levels has not been defined. The qualitative relationships established by the EPA Chesapeake Bay study are such to justify interim reduction goals, but more research is necessary to pinpoint the final goal. Without this additional research, there may be unnecessary expenditure of public funds to attain unnecessarily low nutrient goals.

4. The December 1983 Conference "Choices for the Chesapeake" surfaced a number of concerns that have been incorporated into the present initiatives. The recommendations of the Water Use Activities Workgroup in the areas of Dredged Material Management, Water Access Management and Vessel Discharge Management have not, however, received the attention given to the recommendations of the Land Use Activities Work Group. A number of initiatives related to Water Use Activities could have major impact on Chesapeake Bay habitats and living resource management.

The present cleanup program supports water quality monitoring and living resource monitoring (primarily stock assessment). These programs as developing are among the best in the nation. In themselves though, they will not be enough to manage Chesapeake Bay into the future. What is needed is a scheme or protocol for monitoring the health of habitats, i.e. a more ecosystem process oriented monitoring program. Such a monitoring program could not be launched now because we lack specific information on some processes and the quantitative link between water quality and living resource numbers. Development of the theory to support and the protocol to attain habitat monitoring program would be a very appropriate new initiative for the Phase II action plan.

5. The Phase II planning process which is now underway has a strong potential for incorporating living resource and habitat protection concerns into Phase II objectives. The programs must, however, decide what is going to drive Phase II: 1) attainment of water quality objectives for the sake of water quality, or 2) management of the Bay for living resources which utilizes water quality criteria and standards as one of its tools.

This distinction may appear picayune, but it is not. Living resource objectives involve a complex suite of issues including species requirements which vary by life stage, habitat requirements which vary by season, consideration of influence of climate and harvest pressure. A living resource management focus would require more flexible approaches than just attaining specific water quality standards.

The research needed to link living resource objectives to habitat objectives is substantial. Unfortunately, the research needs to accomplish this have not been clearly articulated. The Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC) (of which I am a member) plans to address the issue of research needs to specifically address Phase II (and beyond) objectives during their September 1986 meeting. I will urge the STAC to consider developing some estimate of the cost to meet these research needs at that meeting and provide your committee with the results of that meeting.

6. The planning process to establish Phase II objectives will, I hope, also address the issues of toxics and their implications on surface, groundwater and living resources. The participation of VIMS personnel in the Phase II planning process, both in its role as advisor to state management agencies and in STAC activities will ensure (as will many other individuals and organizations) that toxics are not ignored in Phase II planning.

7. The present organizational structure for the Chesapeake Bay Program is a unique experiment that is still ongoing. It has recognized the need for change and has implemented new components (e.g. establishment of the STAC). At this time a major revision does not appear to be required. The strong emphasis on living resource objectives does suggest, however, that a federal agency responsible for living resource management might add to the usefulness of the Executive Council in dealing with policy issues. The states presently have two members on the Council, addition of another federal representative from an agency with major responsibility for living resource management would not unbalance the present representativeness of the Council.

8. I believe the best way for the federal government to encourage greater local government participation in the Bay program is through continued full (including financial) participation with the states and continued support for the educational programs conducted through the states and such organizations as the Citizens Program for the Chesapeake Bay. An informed and interested public is the best motivating force for local government participation. Federal involvement will ensure that parochial interests are subordinated to widely acceptable goals and objectives.

I hope these comments are of assistance to you and your colleagues during your deliberation of the Chesapeake Bay Program reauthorization. This is an important federal program, and it should be continued and improved. The example of what is being accomplished here in the Bay is being closely followed by estuarine and coastal managers nationally and internationally. The program should not be terminated or be left bereft of federal involvement.

The opinions expressed herein are mine and should not be construed as representing or attempting to represent those of the Commonwealth of Virginia. Thank you for the opportunity to comment.

Sincerely,

Frank O. Perkins

Frank O. Perkins
Dean/Director

cc: Senator John Warner
Senator Paul Trible

MARYLAND · VIRGINIA
"Potomac River Compact of 1958"

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Legal Officer

June 23, 1986

The Honorable Charles McC. Mathias, Jr.
Chairman, Senate Subcommittee
on Governmental Efficiency and
the District of Columbia
Hart Senate Office Building, Room 442
Washington, DC 20510

My dear Senator Mathias:

Thank you for your letter of May 29, 1986, inviting us to comment on the future direction of the Chesapeake Bay cleanup program.

The Potomac River Fisheries Commission, established under the Maryland and Virginia Potomac River Compact of 1958, has as it sole purpose the management of the tidal Potomac's fisheries. Our role has been recognized by the Congress in its affirmation of the Compact and most recently in efforts to protect the Atlantic striped bass stocks. Fisheries management can only be successful if water qualities are sufficient to support aquatic life. The Commission, realizing the dependence of a healthy environment to achieving any management goals, strongly supports the re-authorization of the Chesapeake Bay cleanup program beyond 1988. Continued Federal and state involvement is vital and the cleanup effort merits continued support and funding by the Congress on a long term basis.

We would hope that Phase II of the program will directly address living resources and habitat protection and provide useful support to organizations such as the Commission that are responsible for management. As with the entire Chesapeake Bay program, the role of the federal government on resource and habitat protection should be to provide financial support and information, develop objectives and project a positive example to state and local governments which are in the best position to assure that the program is implemented in such a manner as to address specific problems. While the federal government must continue to act as the organizational umbrella for the Chesapeake Bay cleanup, the program is best implemented by the states and localities through laws and regulations addressing the development and community growth.

The Chesapeake Bay cleanup program has been greatly successful, both in terms of environmental improvement and as a model of federal, state and local cooperation. Thanks to the leadership of persons like yourself great strides have been made in improving the Bay, but to insure success into the future strong political leadership and dedication to a common goal is required.

Sincerely,

Michael McKenney

Michael McKenney
Administrative Assistant

MM/emd

TESTIMONY OF DONALD L. SPICKLER
BEFORE SENATOR CHARLES Mc. MATHIAS, JR'S SENATE SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY AND THE DISTRICT OF COLUMBIA

JUNE 24, 1986

SENATOR MATHIAS, MEMBERS OF THE COMMITTEE, THANK YOU FOR INVITING ME TO SHARE MY VIEWS WITH YOU CONCERNING THE FUTURE DIRECTION OF THE CHESAPEAKE BAY PROGRAM.

AS A DAIRY FARMER, SOIL CONSERVATION SUPERVISOR, MEMBER OF THE STATE SOIL CONSERVATION COMMITTEE, AND PRESIDENT OF THE MARYLAND ASSOCIATION OF SOIL CONSERVATION DISTRICTS, MY CONCERNS CENTER AROUND MARYLAND'S AMBITIOUS PROGRAM TO HALT AGRICULTURAL NONPOINT SOURCE POLLUTION USING SOIL CONSERVATION DISTRICTS AS THE DELIVERY SYSTEM.

MARYLAND'S SOIL CONSERVATION DISTRICTS HAVE BEEN WORKING TO PROMOTE IMPLEMENTATION OF CONSERVATION PRACTICES SINCE 1938. THE FEDERAL SOIL CONSERVATION SERVICE, WHICH PROVIDES THE TECHNICAL EXPERTISE AND TRAINING REQUIRED TO DO CONSERVATION PLANNING, HAS PROVIDED SUPPORT IN

VARYING DEGREES OVER THE YEARS, BUT IT WAS NOT UNTIL THE RESULTS OF THE CHESAPEAKE BAY PROGRAM WERE PUBLISHED THAT THE STATE RECOGNIZED THE NEED FOR STRENGTHENING THE SOIL CONSERVATON DISTRICT NETWORK IN ORDER TO HALT AGRICULTURAL NONPOINT SOURCE POLLUTION.

AT THAT TIME, MARYLAND'S AGRICULTURAL INTERESTS DEVELOPED A PLAN TO IMPLEMENT THE CONSERVATION MEASURES NECESSARY TO CONTROL AGRICULTURAL POLLUTION TO THE BAY. WE DECIDED TO USE THE EXISTING NETWORK OF SOIL CONSERVATION DISTRICTS TO PROVIDE OUTREACH, SIGN UP FARMERS, AND DESIGN PLANS AND PRACTICES TO CONTROL BOTH SEDIMENT AND CHEMICAL RUNOFF, THUS SAVING OUR SOIL AND PROTECTING THE WATER QUALITY OF THE BAY AND ITS TRIBUTARIES.

DISTRICTS ARE INDEPENDENT POLITICAL SUBDIVISIONS OF THE STATE, CHARGED WITH PROVIDING TECHNICAL SERVICES AND ADVICE IN CONSERVATION MATTERS. THEY ARE ALSO CHARGED WITH FINDING FUNDS TO SUPPORT THEIR

ACTIVITIES. TRADITIONALLY, SUPPORT HAS BEEN PROVIDED BY THE SOIL CONSERVATION SERVICE, THE STATE SOIL CONSERVATION COMMITTEE, AND LOCAL GOVERNMENT. UNTIL THE CHESAPEAKE BAY PROGRAM, MOST OF MARYLAND'S SCD'S WERE SURVIVING ON DWINDLING FEDERAL SUPPORT AND MINIMAL STATE SUPPORT WITH 38 STATE POSITIONS ASSIGNED TO 24 DISTRICTS, AND ABOUT $3,000 IN GRANTS TO EACH DISTRICT PER YEAR.

THE BAY PROGRAM CHANGED ALL THAT--THE DYNAMICS OF THE FEDERAL, STATE, AND LOCAL PARTNERSHIP WHICH MAINTAIN A SOIL CONSERVATION DISTRICT CHANGED. MARYLAND'S DEPARTMENT OF AGRICULTURE NOW PROVIDES OVER 100 STAFF POSITIONS AND $4 MILLION IN OPERATING FUNDS. SINCE 1983, SOIL CONSERVATION AND WATER QUALITY CONSERVATION EFFORTS HAVE INCREASED DRAMATICALLY STATEWIDE. THE MARYLAND AGRICULTURAL COST-SHARE PROGRAM HAS ALREADY PROVIDED $7 MILLION FOR OVER 3,000 PROJECTS. RESPONSE TO THIS COST-SHARE PROGRAM HAS BEEN OVERWHELMING, AND THE NUMBER OF APPLICATIONS GROWS DAILY.

ANOTHER IMPORTANT FACTOR HAS BEEN THE CONTINUED FEDERAL SUPPORT OF USDA'S SOIL CONSERVATION SERVICE, WHICH PROVIDES THE DISTRICTS WITH THE TECHNICAL EXPERTISE TO TRAIN BOTH STATE AND DISTRICT PERSONNEL. SCS PROVIDES THE TECHNICAL MACHINERY WHICH DRIVES THE DISTRICT. MDA AND LOCAL GOVERNMENTS PROVIDE THE FUEL IN THE FORM OF ADDITIONAL STAFF, EQUIPMENT, OFFICE SPACE, ETC. DISTRICT SUPERVISORS STEER THE SHIP AND CONTROL THE THROTTLE, SETTING PRIORITIES AND GUIDING OVERALL PLANNING. WITHOUT THE DEDICATION OF EVERY GROUP INVOLVED, OUR EFFORTS WOULD FAIL.

IN RESPONSE TO YOUR QUESTION CONCERNING A CONTINUING FEDERAL ROLE, IT IS MY FEELING THAT WE MUST HAVE A LONG-TERM, SELF-RENEWING FEDERAL COMMITMENT TO CONTINUE AND MAINTAIN THE CLEANUP EFFORT--NOT JUST FOR FIVE OR TEN YEARS, BUT FOR THE FORESEEABLE FUTURE. IN THAT REGARD, I FEEL THAT A BAY RE-AUTHORIZATION BILL IS NEEDED--IF POSSIBLE, IN PERPETUITY.

AGRICULTURE IS DEEPLY COMMITTED TO MARYLAND'S BAY INITIATIVES, REGARDLESS OF RE-AUTHORIZATION. WE WILL BE REQUESTING MORE PEOPLE AND DOLLARS TO PLACE IN SOIL CONSERVATION DISTRICTS IN THE 1987 STATE BUDGET, AND HAVE RECENTLY OBTAINED ANOTHER $8.5 MILLION DOLLARS FOR THE MARYLAND AGRICULTURAL COST-SHARE PROGRAM TO BE USED IN FY 1987-88. WE HAVE ALREADY USED OVER $7 MILLION OF THE $17 MILLION AUTHORIZED FOR THIS EXTREMELY IMPORTANT CONSERVATION PROGRAM. IN ORDER TO USE THESE TOOLS, IT IS VITAL THAT SCS CONTINUE TO BE FUNDED AT LEAST AT 1986 LEVELS TO KEEP THE ENGINE RUNNING AT ITS PRESENT SPEED. IN ADDITION, WE WILL NEED THE AGRICULTURAL COST-SHARE FUNDS ADMINISTERED BY USDA'S AGRICULTURAL STABILIZATION CONSERVATION SERVICE TO BOLSTER AND COMPLIMENT STATE EFFORTS.

TO EFFECTIVELY ACCOMPLISH PHASE II, AGRICULTURE WILL NEED ALL THE HELP IT CAN GET FROM THOSE FEDERAL PROGRAMS NOW SLATED FOR SHUT-DOWN.

RURAL CLEAN WATER PROGRAMS, RESOURCE CONSERVATION AND DEVELOPMENT, WATERSHED OPERATION (PL-566). WATERSHED PLANNING, RIVER BASIN SURVEYS, AND THE RURAL ABANDONED MINE PROGRAM ARE ALL INTEGRAL PARTS OF A TOTAL CONSERVATION AND WATER QUALITY PROGRAM. WE CANNOT AFFORD TO LOSE ANY OF THESE, AND THEY SHOULD BE MAINTAINED AT 1986 LEVELS AT THE VERY LEAST. IN ADDITION, WE SHOULD LOOK CAREFULLY AT THE EFFECTS OF PROPOSED TAX REFORMS SUCH AS HR3838, WHICH PRECLUDES USING TAX EXEMPT BOND MONIES FOR GRANTS TO PRIVATE ENTITIES, ON THE STATE'S ABILITY TO FUND ITS COST-SHARE PROGRAM. WE MUST MAKE SURE THAT WE DO NOT LOSE THE ABILITY TO CONTINUE THIS MOST SUCCESSFUL EFFORT.

LAST, BUT NOT LEAST, THE EDUCATION OF FARMERS CONCERNING THE BENEFITS AND COST-EFFECTIVENESS OF CONSERVATION MUST CONTINUALLY BE CARRIED OUT BY THE COOPERATIVE EXTENSION SERVICE. IT IS THE EXTENSION AGENT WHO PROVIDES ADVICE AND COUNSEL SHOWING THE FARMERS HOW TO MAKE CONSERVATION PAY. IT IS LAND GRANT COLLEGES, SUCH AS THE UNIVERSITY OF MARYLAND

AND EXTENSION WHICH ARE DOING THE RESEARCH NECESSARY TO LINK THE RESULTS OF GOOD LAND MANAGEMENT WITH GOOD WATER QUALITY, AND THE DEMONSTRATION PROJECTS THAT APPLY THESE RESULTS IN THE REAL WORLD. THE BAY PROGRAM WILL SUFFER IMMEASURABLY IF EXTENSION'S INFORMATION AND EDUCATION OUTREACH SYSTEM IS PRUNED OR ELIMINATED BY FEDERAL CUTBACKS.

AS A SUPERVISOR, A FARMER, AND A MEMBER OF THE STATE COMMITTEE, IT IS MY FERVENT HOPE THAT THE PROGRAM DEVELOPED BY MARYLAND'S AGRICULTURAL COMMUNITY IS NOT THREATENED BY A WITHDRAWAL OF FEDERAL SUPPORT IN RESPONSE TO INCREASED STATE HELP. SOIL EROSION AND WATER QUALITY PROBLEMS ARE NEVER-ENDING. CONSERVATION PLANS DESIGNED TODAY WILL NEED UPDATING FIVE OR TEN YEARS FROM NOW. LAND WILL CHANGE HANDS, USES WILL CHANGE. CONSERVATION IS BY NATURE A DYNAMIC PROCESS, NEVER-ENDING, AND CONSTANTLY DEMANDING. YOUR HELP IN OBTAINING A SUSTAINED FEDERAL COMMITMENT OVER THE LONG-TERM WOULD BE MOST APPRECIATED.

OUR MOTTO, "MARYLAND FARMERS, PARTNERS WITH THE BAY," HAS ONLY BEEN MADE POSSIBLE BY THAT GREATER PARTNERSHIP OF FEDERAL, STATE, AND LOCAL AGENCIES WHICH MAKE UP A SOIL CONSERVATION DISTRICT. TO GET THE JOB DONE, THE PRESENT BALANCE MUST BE MAINTAINED OR STRENGTHENED--NOT WEAKENED BY FURTHER FEDERAL CUTBACKS.

THANK YOU FOR YOUR ATTENTION, AND FOR THE OPPORTUNITY TO SHARE MY VIEWS WITH YOU TODAY.

STATEMENT OF THE U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR, BEFORE THE SENATE COMMITTEE ON GOVERNMENTAL AFFAIRS, SUBCOMMITTEE ON GOVERNMENTAL EFFICIENCY AND THE DISTRICT OF COLUMBIA, ON THE FUTURE DIRECTION OF THE CHESAPEAKE BAY CLEAN-UP PROGRAM

JUNE 24, 1986

The Geological Survey is pleased to participate in the clean-up and restoration of the Chesapeake Bay. We need not tell this Committee about the unique and important role the Bay plays in the economic and cultural life of the United States, and of the eastern seaboard, in particular. Nor do we need to detail the necessity to restore the Bay to its former condition. However, we would like to describe some of the activities we are undertaking to help bring about this restoration.

Our role in the clean-up program is a three-part effort involving:

1) the collection of basic hydrologic, geologic, and cartographic data and information within and about the Bay, its tributaries, and the surrounding region;

2) carrying out a number of specific research projects aimed at generating new information and insights about the geologic and hydrologic conditions and processes which created the Bay, and their interaction with the activities of man, which continues to affect it;

3) creating, organizing, and providing the basic earth science data and information about the Bay and its surrounding region in the form of maps, reports, computerized data bases, geographic information systems, and other forms of publication, for use by the many Federal, state, and local government and academic organizations which are similarly involved in Chesapeake Bay research and/or clean-up activities.

Many of our Bay related activities are being carried out in cooperation with other state or Federal agencies. For example, we are engaged, with agencies of the States of Virginia and Maryland, in a project using high-resolution geophysical surveys and coring studies to map the the bottom of the Bay, its sediments and underlying geologic structure, the location and migration of shoals and channels, and the effects of natural processes (e.g., shoreline erosion) and the works of man (e.g., dredging) on currents and sedimentation. This research will help to provide a better understanding of the ancient and modern geologic and hydrologic processes which influenced the natural history and evolution of the Bay, its environment, and some of its species. These studies will also enable us to separate the impacts of natural processes, which are difficult or impossible to change, and man-induced effects, which may be more susceptible to change and improvement.

Another major set of activities undertaken in cooperation with state agencies involves several different studies on ten of the major tributaries to the Bay in Pennsylvania, Maryland, and Virginia (the Susquehanna, Conestoga, Patuxent, Choptank, Potomac, Rappahannock, Mattaponi, Pamunkey, James, and Elizabeth Rivers). On the Susquehanna, Conestoga, and Patuxent Rivers, we are investigating the effect of agricultural "best management practices" on nonpoint sources of pollution, varying animal populations and methods of cultivation, application of commercial and animal fertilizers and nutrient runoff, concentrations of ammonia, nitrogen, and phosphorous, and their effects on ground water and surface water quality, and the effect of ground water on surface water. At 15 additional sites, we are investigating suspended sediments, metals, total organic carbon, pH, and temperature. At three more sites, the impact of storm water infiltration basins on the management of nonpoint source pollution is being studied.

These, together with other on-going activities of the Geological Survey in the general Bay region not specifically identified with the Chesapeake Bay program, have and will generate large amounts of data and information, most of which is or will be computerized. To handle this information, a number of data bases have been added to or created, by ourselves and others. To facilitate use and comprehension of the information, we are developing a Geographic Information System, using some 30 different sets of data generated by ourselves and other cooperating agencies performing research in the Elizabeth River Basin.

The other major activity of our Bay program is the preparation of a number of special map products to supplement the already available topographic and land-use/land-cover map coverage of the entire Chesapeake Bay region. These include special Landsat image maps of areas in Virginia already produced, and orthophotoquads of areas in Virginia and Maryland which are being produced at the request of other Federal agencies for their (and others') use in the Chesapeake Bay program.

This briefly describes our activities undertaken thus far directly in support of the Bay clean-up program. Other on-going programs of the Geological Survey have and will continue to contribute information valuable to the development of the plans and strategies for the clean-up. Should the Committee need any further details on any part of our programs, we would be pleased to provide it.

WATER POLLUTION CONTROL FEDERATION

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July 8, 1986

Honorable Charles McC. Mathias, Jr.
Chairman, Subcommittee on Governmental
Efficiency and the District of Columbia
442 Hart Senate Office Building
Washington, D.C. 20510

Dear Senator Mathias:

In accordance with your request, attached are responses from Federation members to your questions regarding the future direction of the Chesapeake Bay cleanup program. We request that these responses be included as part of the record from the Subcommittee's June 24, 1986 hearing on this subject.

These responses present the views of individual WPCF members from our Member Associations in the Chesapeake Bay region -- the Federal Water Quality Assocation, the Virginia Water Pollution Control Association, and the Chesapeake Water Pollution Control Association.

Our respondents are unanimous in their support of the Chesapeake Bay program amd the need for continued federal leadership beyond 1988. The federal committment should include special technical and financial assistance for both point and nonpoint control programs. In addition, local government entities, including wastewater treatment authorities, should be more involved in the planning stages of control programs. EPA-sponsored seminars or conferences, as well as development of a more cooperative, "we're all on the same side" attitude on the part of EPA toward local agencies, would serve to encourage greater local participation in the Bay program.

On behalf of the more than 30,000 WPCF members, representing all aspects of the water pollution control field, I would like to express sincere thanks and appreciation to you, Mr. Chairman, for the leadership you have provided in promoting the restoration of the Chesapeake and in support of clean water issues generally. Your planned departure from the Senate leaves a void in this area that will not be easily filled.

Sincerely,

Robert A Canham
Robert A. Canham

RAC:tsw
enclosures

FEDERAL WATER QUALITY ASSOCIATION
AN AFFILIATE OF THE WATER POLLUTION CONTROL FEDERATION

Responses of

K. Jack Kooyoomjian, Ph.D.

Member, Federal Water Quality Association
Director-Elect, Water Pollution Control Federation

to Questions from

Charles McC. Mathias, Jr., Chairman

Subcommittee on Governmental Efficiency
and the District of Columbia
Committee on Governmental Affairs

United States Senate

Regarding the Future of the

Chesapeake Bay Program

June 24, 1986

1. The federal role beyond 1988 in Bay restoration should focus on coordinating and assisting the states and localities in setting goals and standards for achieving ambitious point and non-point source controls. The Chesapeake Bay, as the largest estuary and bay area in the world, deserves high priority among citizens, private parties and all levels of government for cleanup. The Bay has geographic features, such as shallow waters and a large drainage area. Nutrients and toxics into the bay from this large area have a profound and dramatic potential to degrade the Bay and to diminish or deny opportunties for commerce and recreational pursuits.

   There is a need for a Bay Reauthorzation Bill beyond 1988. The bill should provide for the following, as a minimum:

   ° Implementation programs to achieve both point and non-point source controls,

   ° Controls for reduction of used and waste oils and other pollutants or potential toxics in the drainage basin area.

   - Promotion of used/waste oil recycling and collection
   - Reduction of underground leakage by aggressive testing and monitoring

   ° Inventory all industrial, municipal and other point sources which are direct discharges, including POTWs.

   - Identify pollutants directly discharged by all point sources
   - Institute more stringent point source controls for Best Available Technology
   - Encouragement of point source waste reduction, recycling and reuse

   ° Inventory all non-point sources and discharges from the drainage area.

   - Identify, as much as possible or feasible all pollutants discharged from non-point sources

   ° Encourage more institutional controls by States and localities, such as in land use and zoning decisions.

   - Assist in aggressive standard setting to develop State and local zoning and land-use decisions requiring adequate buffer zones.

- Buffer zone legislation is mandatory and essential to properly recognize the filtering, erosion control, water quality and ecological (wildlife habitat and sensitive natural resource area impacts) benefits of buffer zones.

° Provide assistance and expertise to act as a coordinator in setting state and local goals and standards for achieving point and non-point source controls.

  - Institute land-use and zoning restrictions on new residential, commercial and industrial projects to minimize adverse impacts on water quality and wildlife habitat protection.

  - Develop standards for Best Management Practices of particular benefit to protecting the water quality features and water quantity features by this ecosystem.

2. The WPCF should continue to support all local, state and federal as well as private party efforts to assess the effectiveness of the various and cleanup and pollution control programs In addition, the WPCF should continue to provide support for additional funding of the various programs oriented at protecting the Bay.

3. There are specific interim goals for nutrient-reduction that can and should be implemented. However, it is suggested that the Chesapeake Bay Executive Council, which was established in accordance with the requirements of the Federal Advisory Committee Act, be a focal point for EPA's nutrient reduction recommendations as well as to review other recommendations offered. The Cheaspeake Bay Executive Council, as defined within the Chesapeake Bay Agreement of December 9, 1983, is assigned the role of "assessing and overseeing the implementation of coordinated plans to improve and protect the water quality and living resources of the Chesapeake estuarine system." (Refer to USPA Advisory Committees, Charters, Rosters and Accomplishments, March 1986). [See attached document exerpts)

   The Cheaspeake Bay Program fiscal year appropriations may need to be increased, and the Chesapeake Bay Program Liason Office Staff, technical support and travel funds for Citizens Advisory Council members may need to be expanded if the Chesapeake Bay Executive Council plays a more active role in assisting to set interim goals for nutrient reduction.

4. Immediate new intitatives that could be undertaken to supplement the phase II action plan include:

   - Better documentation and inventorying of point and non-point sources of pollution

   - Comparsion of trade-offs of costs and benefits to implement nutrient reduction goals in phases

- More concise documentation of controls necessary to reduce impacts of oils, petroleum products and toxics
- Better documentation of inventories for petroleum and toxics in the drainage basin
- More innovative mechanisms to achieve solutions for removing institutional barriers for point and non-point source controls
- More aggressive application of BMP techinques and land use decisions of particular benefit to the Bay area

5. In order to better manage living resources and habitat protection, research should be encouraged to collect "lessons learned" at other locations having similar or related problems. The literature should be systematically scanned and reviewed for development of a comprehensive treatment of all available point and non-point source controls. The Phase II action plan can then be restructured into a systematic management plan based on a comprehensive review world-wide experiences. The funding for this should not be excessive. It is estimated that a 3 year effort costing approximately $600,000 and involving no more than 6 to 8 work years, or 2 to 3 FTE's could achieve a reasonably comprehensive review of all known literature and pollution control experiences with summary recommendations that might apply to the Chesapeake Bay cleanup effort.

6. The phase II toxic or other harmful substances contamination of surface and ground water of the Bay area should incorporate a plan to indicate how all Clean Water Act oil pollution control, CERCLA hazardous substances and underground storage tank pollution control efforts could be integrated into point and non-point source controls. This is an ambitious undertaking which will involve a long-term committment. The Federal, State and local efforts need to be integrated into a sensible and acheiveable program. Possible alternatives and options should be referred to the Chesapeake Bay Executive Council for coordination and resolution.

7. The present Executive Council management structure can be improved upon. It is suggested that the various pollution control-oriented societies can be consulted with more actively regarding goal setting priorities. A consultative mechanism with WPCF might assist in this endeavor.

8. The federal government can encourage greater local government participation in the Bay cleanup process by sponsoring focused seminars and conferences where national experts can be invited to participate in the inventoring, literature search and goal setting process. An annual conference which selects a particular theme of interest, such as point or non-point source controls, nutrient-reduction goals, habitat protection, land use controls, creation of buffer zones, limitations of residential, commercial and industrial growth in certain sensitive habitat areas, and application of BMPs may assist in achieving better federal and local focus of the issues at hand.

U.S. ENVIRONMENTAL PROTECTION AGENCY
ADVISORY COMMITTEES
CHARTERS, ROSTERS, AND ACCOMPLISHMENTS

March 1986

Prepared by:

Management and Organization Division (PM-213)
Office of Administration, OARM

Additional copies of this report may be obtained by
contacting the Management and Organization Division
(202) 382-5036

United States
Environmental Protection Agency
Washington, D.C. 20460

The Administrator

It has been 15 years since the Environmental Protection Agency was founded. During the ensuing years, we have grappled with complex issues affecting every environmental medium -- our air, our water, and our land.

Today, the progress we have made is evident. The air in our cities is noticably cleaner than it was in 1970. Thousands of miles of streams and rivers are again fishable and swimmable. We have in place comprehensive regulations for managing disposal of hazardous wastes, and a response program for cleaning up the legacy of past mismanagement of those wastes.

Despite these achievements, however, our job is far from finished. Not only must we continue to aggressively implement these basic programs of the 1970s. But we must also address the more complex and subtle issues of the 1980s.

For example, we must work harder to understand the risks associated with toxic chemicals in our society. Contamination of groundwater resources by pesticides, wastes and other sources is another area requiring our attention. And we need a better appreciation for the cross-media consequences of the regulatory decisions we make in every program area.

To meet these challenges, EPA has developed a solid base of scientific expertise. Yet in order for our regulatory decisions to stand the test of public scrutiny, we continue to rely upon the insights, experiences, and independent views of our advisory committees. Their advice and recommendations contribute to the credibility of our decisions.

As always, we are grateful to the men and women who serve as EPA advisory committee members. Their contributions are valuable to this agency, this Administration, and to all Americans.

Lee M Thomas

January 1986

EPA ADVISORY COMMITTEES

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

ADVISORY COMMITTEE CHARTER

ORGANIZATION AND FUNCTIONS - COMMITTEES, BOARDS, PANELS, AND COUNCILS

CHESAPEAKE BAY EXECUTIVE COUNCIL

1. PURPOSE. This charter establishes the Chesapeake Bay Executive Council in accordance with the requirements of the Federal Advisory Committee Act, 5 U.S.C. (App. 1) Section 1 *et seq*.

2. AUTHORITY. It is determined that establishment of this Council is in the public interest in connection with the performance of the Environmental Protection Agency's (EPA's) duties and responsibilities under the Clean Water Act of 1981, as amended, (CWA) (P.L. 97-117), 33 U.S.C. 466 *et seq*.

3. ROLES AND RESPONSIBILITIES. The Chesapeake Executive Council, as defined within the Chesapeake Bay Agreement of December 9, 1983, is assigned the role of "assessing and overseeing the implementation of coordinated plans to improve and protect the water quality and living resources of the Chesapeake estuarine system." The Chesapeake Bay Liaison Office will provide the necessary staff and technical support to assist the Council. Responsibilities consistent with this charter include the following:

- Provide the chief executive forum for discussing the coordination of Bay management plans and other related topics.
- Evaluate whether EPA's and the States' plans are coordinated to the extent that their respective implementation will have the combined effect of cleaning up the Bay.
- Assess the progress EPA and the States are making in the implementation of combined plans to restore the Bay and its resources.
- Reach consensus on recommendations to EPA for the most appropriate use of Federal Chesapeake Bay funds within the general guidelines established by Congress. This is to include implementation funds to be granted to the States.
- Report to the Administrator on issues pertaining to implementation of Chesapeake Bay initiatives.

4. MEMBERSHIP AND MEETINGS. The Council will consist of nine (9) members. These members are Governor cabinet designees from the States of Pennsylvania, Virginia, Maryland, and the District of Columbia and the EPA Regional Administrator, Region III. The Council will schedule at least two meetings annually.

5. PROGRAM SUPPORT. The Chesapeake Bay Program has received a fiscal year 1984 appropriation of $4.25 million. The estimated operating cost of the Executive Council totals approximately $75,000, which includes 1.0 work-year of the Chesapeake Bay Program Liaison Office staff, technical support, and travel funds for Citizen Advisory Council members. The $75,000 are Federal funds directly supporting the Executive Council activities.

6. DURATION. The Council will be needed on a continuing basis. This charter will be effective until January 31, 1987, at which time the charter may be renewed for another two-year period.

A. James Barnes
Deputy Administrator

JUL 5 1985
Agency Approval Date

JUN 14 1985
GSA/OMB Review Date

AUG 6 1985
Date filed with Congress

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CHESAPEAKE BAY EXECUTIVE COUNCIL

RECENT ACCOMPLISHMENTS

The Executive Council during its first year of activity, 1985, established the guidelines for the Chesapeake Bay Program cleanup activities by adopting two documents, The Chesapeake Bay Restoration and Protection (R&P) Plan and the First Progress Report under the Chesapeake Bay Agreement, which were published by the Environmental Protection Agency in September and December 1985, respectively.

The first document, the R&P Plan, describes the planning effort implemented in response to the Chesapeake Bay Agreement of December 9, 1983, to restore and protect the Bay by the Chesapeake Bay community which includes primarily the District of Columbia, and the States of Maryland, Virginia, and Pennsylvania, the Chesapeake Bay Commission, and the Environmental Protection Agency and other Federal agencies.

The R&P Plan is structured to address the goals and objectives of the Chesapeake Bay restoration and protection effort. It has been formulated based on our present understanding of the causes of the decline in the Bay's health and productivity resulting from a 6 year EPA research study. The plan describes the Federal and State strategies and programs which are to be implemented to meet the objectives and goals of the restoration and protection commitment.

It describes projects being implemented to reduce pollution loading into the Bay. The main sources of pollution fall into two categories, point source and nonpoint source. The pollutants consist of nutrients, such as nitrogen and phosphorous, and toxic metals and organics. The nutrients from sewage plants and runoff overload the Bay causing severe anoxia, reduced growth of submerged aquatic vegetation and elevated levels of toxic chemicals.

The First Annual Report under the Chesapeake Bay Agreement comprehensively addresses the different Bay activities which includes the roles of all the different groups and agencies working together, current programs to clean up the Bay, and all the support activities such as the monitoring, modeling and research, data management, and citizen participation.

These documents describe the activities which the Executive Council oversees and are available by contacting:

Ms. Patricia Bonner, Public Affairs Representative
U.S. EPA Chesapeake Bay Program, Suite 109-110
410 Severn Avenue
Annapolis, Maryland 21403

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Responses of

James R. Borberg, P.E.

General Manager, Hampton Roads Sanitation District
Member, Virginia Water Pollution Control Association

to Questions from

Charles McC. Mathias, Jr., Chairman

Subcommittee on Governmental Efficiency
and the District of Columbia
Committee on Governmental Affairs

United States Senate

Regarding the Future of the

Chesapeake Bay Program

June 24, 1986

1. **The authorization for the Chesapeake Bay Program expires in 1988, but the restoration effort will take years. What do you see as the Federal role in the Bay restoration effort beyond 1988? Do you see a need for a Bay-reauthorization bill beyond 1988, and if so, in what form?**

Since the Bay has been signaled out for special actions, special funding should also be provided. A meaningful grant program needs to be developed which would concentrate on point sources as well as non-point sources.

Before restoration efforts can be meaningfully discussed in terms of costs and benefits it will be necessary for definitive water quality management plans to be developed for each river basin discharging into the Bay. For example, the Bay Program has generally concluded that nutrient levels are too high in the Bay and that water quality has consequently deteriorated. Focused on a more regional scale, the upper reach of the Lower James (between Richmond and the Chickahominy River) is clearly nutrient enriched and suffers from excessive algae blooms. The lower reach of the Lower James (Hampton Roads), however, is naturally quite turbid and although nutrient levels are moderate to high, algae growth is limited. The Lower Bay has low to moderate nutrients and no excessive algae growth.

A cost effective nutrient control scheme for the Lower James would, therefore, involve different approaches for different portions of the river.

We believe that the federal government should have a key role in the further study of the Bay and development of regional restoration efforts. This role should involve overall program guidance and coordination of local government and wastewater treatment agencies so that regional restoration efforts accomplish the broader goal of Bay-wide protection.

2. **Regardless of whether or not there is a reauthorization bill, how do you plan to integrate your program into phase II of the implementation stage? What federal funding and program resources will you need to effectively accomplish your objectives in phase II?**

Unfortunately, the design of the Bay Program and consequent studies were completed with very little input from local wastewater treatment agencies. In fact, it was not until the final report was in preparation that the Bay Program staff considered the extensive data base the Hampton Roads Sanitation District had available for both our effluents and area water quality conditions. Since we treat wastewater for 25% of Virginia's population, our actions can be a significant factor in any restorations program.

One of the District's primary objectives, which should be considered a critical element in phase II, is the design and construction of a 40 MGD innovative/alternative technology wastewater treatment plant which we have called the Virginia Initiative Plant (VIP). This is a secondary treatment plant but will biologically remove from 65 to 75% of the nitrogen and phosphorus and will discharge into the Elizabeth River (Lower James). This plant can be constructed for approximately the same capital and operating costs as a conventional secondary treatment plant. Although we and the Virginia State Water Control Board have agreed that the plant is truly innovative and represents a major step forward in demonstrating this important technology in the Bay region, almost every action that the EPA has taken with regard to the project has been negative. Thus, from our limited perspective it seems that EPA is currently committed to a cleanup of the Bay on paper only.

We believe that if nutrient removal is to be practiced throughout the Bay region it is imperative that both the state and federal governments develop appropriate construction grant funding that specifically deals with point sources. This funding should be targeted exclusively to the Bay region and should not be subject to the current EPA AWT review procedures. Such activity on the part of state and federal government will represent a significant commitment to a cleanup of the Bay and will encourage local government to enter into a meaningful partnership where all parties share in the costs and benefits on an equitable basis.

3. **Are there specific interim nutrient-reduction goals that can be implemented within the next year for point and non-point sources of pollution? If so, what should those goals be and how can they be implemented?**

   The process used at our Virginia Initiative Plant should be considered when other plants are built.

4. **What immediate new initiatives could be undertaken to supplement the phase II action plan?**

   As mentioned previously, we believe that the most significant new initiative which can be taken to supplement the phase II action plan is development of a construction grant program targeted specifically to additional point source facilities being required throughout the Bay region.

   The second most important initiative is development and maintenance of ongoing water quality studies. If we are to responsibly manage the resources of the Bay we must evaluate each significant step taken in terms of its overall impact. For example, it would be imprudent to immediately undertake Bay-wide nutrient removal of all point source discharges. Rather, certain test basins (or sub-basins) should be identified and tested using comprehensive nutrient control strategies (point and non-point). Studies of such basins would allow for the development of optimal control strategies. Without such studies we might find that after Bay-wide nutrient controls are in place the decline in water quality we have documented might have been unrelated to nutrients but perhaps some other variable, for example, turbidity.

   Test basins should play an important role in reinforcing the need for nutrient controls and for selecting the necessary types of controls. The early results of the Bay study called for Bay-wide phosphorous controls. Many scientists including ourselves questioned the benefits of phosphorous controls in an estuary. Recent investigations however have shown that the saline portions of the Bay are nitrogen limited and therefore would not benefit from phosphorous controls and the Bay program has been changing to recognize this new data. Thus the concept of test basins can be used to fine-tune control strategies in order to optimize benefits.

5. **How will living resources and habitat protection concerns be incorporated into phase II objectives? What research or initiatives on living resources and habitat protection is needed to meet phase II objectives? What are the future funding needs in this respect?**

   We believe that living resources may be adequately protected from water quality problems through the water quality standards and criteria. Unfortunately, however, habitat is not similarly protected. We believe that there must a concerted effort to identify critical habitat and development of appropriate strategies to protect it. The amount of funding required for this effort is unknown.

6. **How can phase II toxic or other harmful substance contamination of surface and ground waters of the Bay area be incorporated into phase II?**

   We believe that toxic contamination of surface and ground waters is being adequately addressed for point sources through pretreatment programs and activities that are underway. However, little has been done with regard to identification and control of toxics contamination of surface and ground waters from non-point sources. Expansion of the Bay Program to identify and develop control strategies for non-point sources will involve a significant commitment in monitoring and planning activities.

7. **With any complex management structure, as in the Bay cleanup program, there is always room for improvement. How can the present organization and Executive Council management structure be refined?**

   As mentioned previously, the biggest weakness in the current organization of the Bay Program is lack of meaningful participation by local government at all stages in the development of the program, including the technical phase. A number of discharges in the Bay have considerable technical/scientific resources which they could commit to such efforts. It will be much easier to implement programs on the local level when local governments and wastewater treatment agencies perceive that they have been full partners in the planning process.

8. **From your perspective, how can the federal government encourage greater local government participation in the Bay cleanup process?**

   Actions should be taken to invite the participation of local governments and Wastewater treatment agencies. In the past, participation from these agencies has been minimal because they weren't asked and in some cases, their input was not considered.

   Moreover, it is essential that both state and federal governments begin to develop programs committing themselves to participation in the tremendous costs associated with the cleanup of the Bay. At that time local governments, the states, and the federal government will be able to enter into a meaningful partnership where all parties share in the costs and benefits on an equitable basis.

I hope that this input is helpful. If you have any questions, I will be happy to address them if you will give me a call.

Sincerely yours,

James R. Borberg

James R. Borberg
General Manager

CHESAPEAKE WATER POLLUTION CONTROL ASSOCIATION, INC

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KAREN WRIGHT ASST SEC TREAS

Responses of

Mr. Henry Silbermann

Former Assistant Secretary, Maryland Depatment of Natural Resources
Government Affairs Chairman, Chesapeake Water Pollution Control Association

to Questions from

Charles McC. Mathias, Jr., Chairman

Subcommittee on Governmental Efficiency
and the District of Columbia
Committee on Governmental Affairs

United States Senate

Regarding the Future of the

Chesapeake Bay Program

June 24, 1986

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KAREN WRIGHT, ASST. SEC.-TREAS.

July 3, 1986

The Honorable Charles McC. Mathias, Jr.
U.S. Senate
Washington, D.C. 20510

RE: Chesapeake Bay Program

Dear Senator Mathias:

We have long admired your initiatives and leadership which resulted in the Chesapeake Bay program, and are pleased to submit our comments herewith.

The Chesapeake Water Pollution Control Association (CWPCA) is a member agency of the Water Pollution Control Federation, and as such has a membership of water pollution control professionals at all levels of the industry. CWPCA represents the States of Delaware and Maryland, and the District of Columbia; it has been a strong supporter of the Chesapeake Bay Program as it was developed and now exists. We urge that a comprehensive, resolute and active process to control pollution and restore Bay resources to acceptable levels be continued well into the future.

Certainly, as has been said many times, the degradation of water quality and resources of Chesapeake Bay has been a gradual event over a period of decades, if not centuries. CWPCA believes that the work needed to restore the Bay to a wholesome condition will likely take decades, and will succeed to the extent there is a strong, longterm federal/state/local partnership in guiding and managing needed controls of pollution from point sources and from non-point sources. Pollution from non-point sources has played a large part in degrading the quality of the Bay, is difficult and costly to control, and will require extensive monitoring, special studies, and the development, testing and application of special programs extending over many years.

To us, this means that the federal government, and specifically the Environmental Protection Agency, must not bow out now or in the near future from the joint federal/state/local effort to restore Bay resources. Chesapeake Bay, which you have often called a precious national resource, cannot be healed by state and local efforts alone. The federal government must continue to provide technical and financial assistance, in addition to the extensive work effort now underway - and continuing - from the Commonwealth of Pennsylvania, the State of Maryland, and the Commonwealth of Virginia.

The Chesapeake Association (that is, CWPCA) is particularly conscious of the complexities, including some uncertainties, of the many issues involved in this matter. We have also kept currently informed about the good works by the Chesapeake Bay Commission, the Chesapeake Executive Council, the Citizens Advisory Committee, the Chesapeake Bay Foundation and other Bay-oriented organizations, and defer to them for specific details regarding the future of the Bay program (with the exception, of course, of comments we have made above).

Again, Senator Mathias, we thank you most sincerely for your pioneering effort on Chesapeake Bay matters, and look forward to your continued involvement in this vital issue.

Respectfully yours,

Henry Silbermann

Henry Silbermann
Chairman, Chesapeake Bay Committee

Enclosure: Comment on List of Questions,
Sen. Mathias' letter of May 29, 1986

Enclosure,
Letter of
July 3, 1986

REGARDING
List of Questions, Senator Mathias' letter of May 29, 1986

The Chesapeake Water Pollution Control Association submits comments as follows:

1 - As indicated in our letter, the federal role is an essential and continuing one; there should be a Bay re-authorization Bill, calling for comprehensive involvement by the federal government.

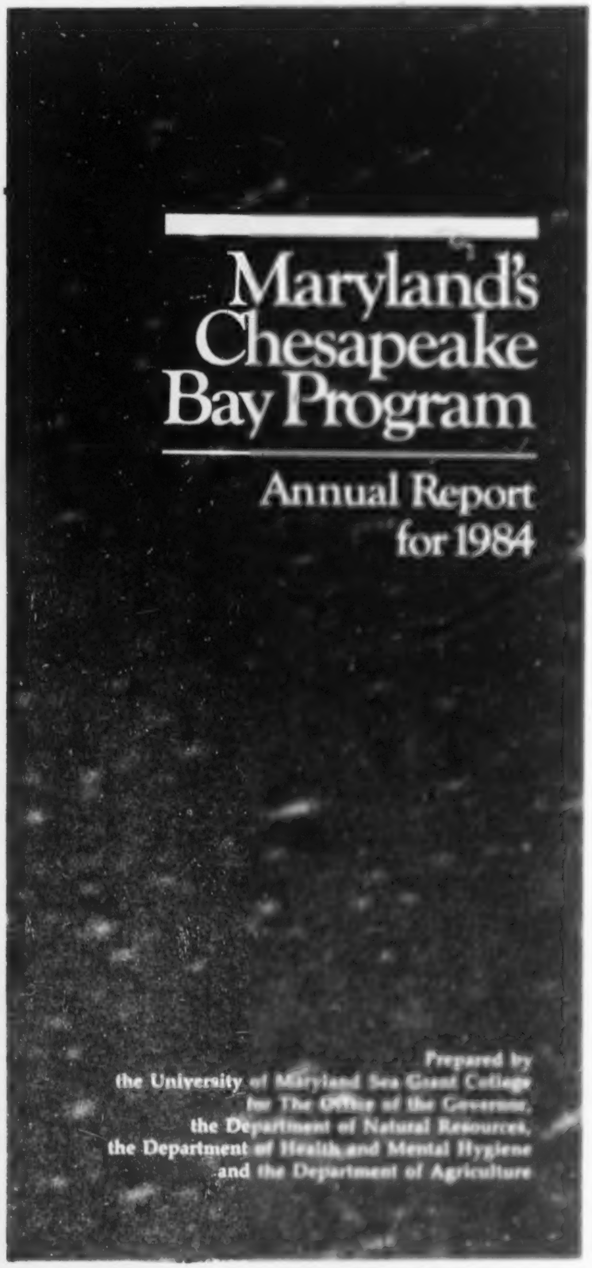
2 - Not applicable to CWPCA.

3, 4, 5, 6 - No Comment.

7 - From our perspective, the existing coordination and management is working effectively.

8 - At the recent Government Affairs Seminar conducted by the Water Pollution Control Federation, a director of a regional sewer district in Ohio chided the U.S. EPA for its adversarial, confrontational attitude, saying: "I wish EPA would recognize that we are all on the same side." A cooperative, "we'll-work-with-you" program and attitude would go a long way to encourage greater participation by local government in the Bay cleanup. (In years past, for example, EPA would - if so requested - send a team of experts to any municipality to consult and advise on the best way to meet effluent requirements at the waste treatment facility)

Submitted by: Henry Silbermann, July 3, 1986
Chairman, Chesapeake Bay Committee



Maryland's Chesapeake Bay Program

Annual Report for 1984

Prepared by
the University of Maryland Sea Grant College
for The Office of the Governor,
the Department of Natural Resources,
the Department of Health and Mental Hygiene
and the Department of Agriculture

A Message

We in the Chesapeake region are confronting a great challenge.

That challenge is to restore the Chesapeake Bay, historically the nation's richest estuary and pride of the mid-Atlantic region. It was largely on the shores of the Chesapeake that our nation began, in Jamestown and Williamsburg, in St. Mary's City and Annapolis. It was in the Chesapeake region that the first settlers found prosperity beyond imagining: fish and oysters and even terrapin for the dinner table, soil rich enough to grow both food and cash crops like tobacco, and forests plentiful enough to provide wood for houses and wagons and ships.

But it has been in the Chesapeake, too, that we have witnessed the effects of our own increasing demands on the environment. The Chesapeake has sustained us through several centuries. It is time for us to repay the Bay for its generosity — and that is the nature of the challenge which confronts us.

To begin to meet that challenge, we in the Chesapeake watershed — the states of Maryland, Virginia and Pennsylvania and the District of Columbia — have joined the U.S. Environmental Protection Agency and the federal government in an unprecedented regional and governmental effort. In December of 1983, these parties committed themselves to a massive program to clean up the degraded waters of the Chesapeake and to help restore the productivity of its declining fisheries. Governor Charles Robb of Virginia, Lieutenant Governor William Scranton of Pennsylvania, Mayor Marion Barry of the District of Columbia and I joined with Senator Joseph Gartland, representing the tri-state Chesapeake Bay Commission, in signing, with the EPA's William D.

from the Governor

Ruckelshaus, the historic Chesapeake Bay Agreement of 1983.

The citizens of Maryland especially have entered this campaign with generosity and enthusiasm, and I believe that we in state government have a responsibility to keep them informed of what steps have been taken and what progress has been made in our effort.

This, then, is a report on the Maryland Chesapeake Bay Program for 1984, a report which I hope inaugurates a series of future annual appraisals of the state of the Bay. While this summary focuses on the beginning of our effort, in subsequent years reports will inform you of changes in Bay water quality and of the effects of programs we have initiated. The enormous effort to clean up the Chesapeake Bay—an effort which draws on the talents and energies of numerous agencies, jurisdictions and citizen groups—is a legacy we can all point to with pride.

Maryland's coordinated Chesapeake Bay Program takes the form of 34 initiatives aimed at reversing the downward trend of the Bay's resources and returning them to a state of health. In the first three months of 1984, the Maryland General Assembly demonstrated the depth of its concern for the Bay by enacting legislation to put those initiatives into operation, authorizing $13.8 million in operating funds and $22.2 million for capital improvements. The state's landmark effort began on July 1, 1984.

We will not repair generations of damage overnight. Results will come only as we pursue these new programs, with diligence and good faith, over the next decade. Despite expected increases in population throughout the watershed, our goal is to restore the Bay and its resources by the year 2000, to the quality we remember from the early 1950s.

Our efforts in Maryland have seen strong national support. The Environmental Protection Agency, and William D. Ruckelshaus in particular, have been responsive partners and loyal allies in our drive to restore the Chesapeake. President Reagan, in last year's State of the Union Address, recognized the importance of preserving the bounty of the Chesapeake Bay, calling it a "national treasure," and included an additional $10 million for the EPA's Bay Program. The Maryland Congressional delegation provided strong leadership in securing Congressional support for the Chesapeake Bay Program, primarily in the form of appropriations for grant assistance to the states for implementation. In further support of this effort, the House Public Works and Transportation Committee and the Senate Environment and Public Works Committee recommended that the Clean Water Act be amended to include a special section for the Chesapeake Bay.

This federal support joins the massive effort underway in Maryland by our state agencies, working closely together, and by individuals and communities and organizations throughout the state. Only through this combined effort will we meet the challenge set before us of restoring the rich and benevolent Bay we call the Chesapeake.

Harry Hughes

We will not repair generations of damage overnight. Results will come only as we pursue these new programs, with diligence and good faith, over the next decade.

The Chesapeake Bay...

Meandering down through Pennsylvania, the Susquehanna broadens into the Chesapeake Bay, formed some 10,000 years ago with the ending of the last ice age. The Bay's tributaries bring fresh water to meet the salt, but they also bring silt and nutrients and waste. The fresh water will eventually pass through the estuary, but we now know that toxics, heavy metals and sediment may remain.

A Resource at Risk

The Chesapeake Bay is well known as the most bountiful estuary in North America. Its fishery harvests, for example, are exceeded only by catches from the Atlantic and Pacific oceans. Its 4,400 square miles include more than fifty principal rivers and a shoreline of over 4,000 miles in Maryland alone. The Bay watershed is home to some thirteen million people—a population increase of 25 percent since 1950—and that figure is expected to reach almost fifteen million by the year 2000. With the clearing of land for farming, the explosive increase of urban areas and the expansion of factories and industry, the Bay and its tributaries have borne the brunt of our growth and have stayed on the receiving end of all the wastes that have resulted.

Each day Maryland's estuary receives some one billion gallons of treated sewage effluent and nearly 20 tons of metal from waste treatment and industrial discharges. Agricultural, urban and suburban runoff dumps tons of sediments, fertilizers and herbicides into the Bay's estuarine waters. The Bay serves countless uses: more than 160 million tons of cargo pass through its channels, and enough Bay water passes through a single nuclear power plant to make it equivalent to the estuary's fourth largest river.

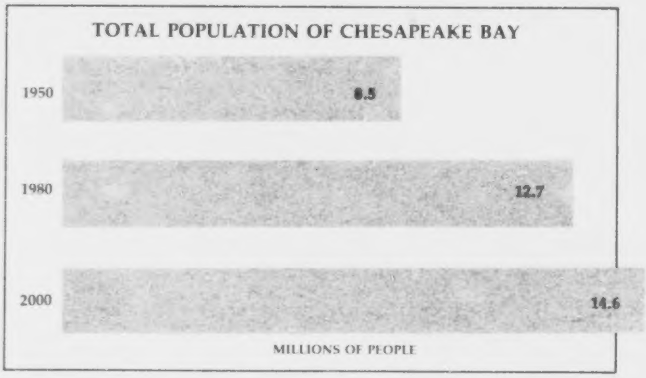
It was once thought that the toxic chemicals, nutrients and metals pouring into streams and rivers passed right through the Bay—as if it were a thoroughfare to the Atlantic Ocean. We now know that is not so. What washes into waters tributary to the Bay remains there. And we are just beginning to learn the consequences.

Harvests of some major species—shad, rockfish and oysters—have been dwindling, underwater grasses disappearing, and noxious algal blooms proliferating on the surface of rivers, choking off sunlight from bottom waters.

To understand the effects of development throughout the Bay watershed, the Environmental Protection Agency in 1977 undertook a comprehensive six-year, $27 million research program to investigate several major problems affecting the estuary. Among its findings are the following:

- Underwater grasses, or submerged aquatic vegetation, are at the lowest levels ever recorded.
- Excessive nitrogen and phosphorus from agricultural runoff, sewage treatment plants, and industrial discharges are causing algae to flourish, depleting oxygen and light essential for the survival of marine life.
- Strong correlations exist between the high phosphorus and nitrogen levels and reduced populations of Bay grasses and fish that spawn in Bay waters.

Since humans first settled by the Bay, these estuarine waters have been generous. During its great years, the Bay has offered up seafood for a nation and provided a unique way of life for those who live on its shores.



According to the EPA, the Bay's basin-wide population saw radical growth between 1950 and 1980, and by the year 2000 the region will gain another 1.9 million people. The highest rates of growth between 1980 and 2000, according to the EPA, are expected in the York, Rappahannock, and Patuxent river basins, though the largest gross increases in population will occur in the three largest basins: the Susquehanna, the Potomac and the James.

- High concentrations of heavy metals and toxic organic compounds have been identified in the sediments of the northern Bay and Baltimore Harbor.
- Areas of oxygen-starved waters are larger and last longer than before.

Based upon this report, the states and the EPA developed specific recommendations to reverse the decline of water quality and to rehabilitate the Chesapeake's living resources. The EPA called for reducing nutrient loads, restricting toxic chemicals, protecting marine organisms, and developing management plans for controlling the massive amounts of pollutants entering Bay waters.

Responding to these recommendations, the governors of Maryland, Virginia and Pennsylvania, the Mayor of the District of Columbia, the Administrator of the Environmental Protection Agency and the Chesapeake Bay Commission convened a historic conference in December, 1983 to coordinate efforts throughout the Bay watershed that would correct the problems identified by the EPA study.

This conference marked the culmination of a new era of regional, federal and state cooperation. In October, 1982 Governor Harry Hughes of Maryland met with Governor Charles Robb of Virginia—they agreed that both states must work together if the decline in the health of the Bay was to be reversed. Because the Susquehanna River accounts for more than 50 percent of the fresh water entering the Bay and much of the nitrogen and phosphorus from land runoff, both governors then met with Pennsylvania Governor Richard Thornburgh in Harrisburg to urge his state's cooperation in the Bay clean-up program. In July, 1983 EPA Administrator William Ruckelshaus traveled the Chesapeake Bay with the three governors and affirmed that the restoration of the Chesapeake Bay is a national concern.

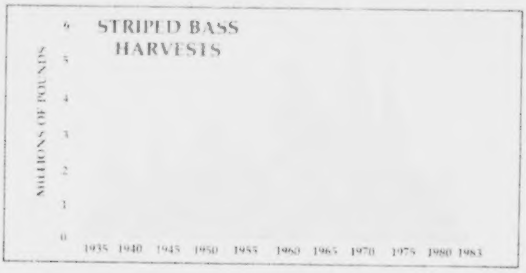
Long before the December, 1983 conference, Governor Hughes instructed his cabinet to work together to improve conditions on the Chesapeake. Cabinet members included Secretaries of the state departments of Natural Resources, Health and Mental Hygiene, Agriculture, and State Planning; they were joined by representatives of the State Department of Education, the Department of Employment and Training, the Department of Economic and Community Development and the University of Maryland. Because they met on the Eastern Shore's Wye

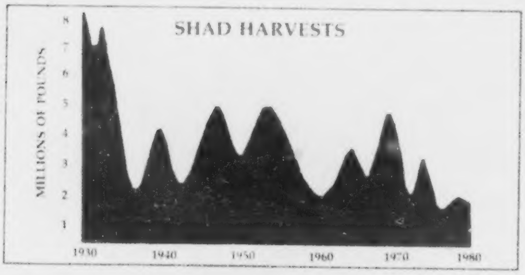
Island, these planners became known as the "Wye Group." The Wye Group examined ongoing Bay management programs within the state, met with public interest groups throughout the state and developed a coordinated series of initiatives that built upon existing strengths while responding to the recommendations of the EPA.

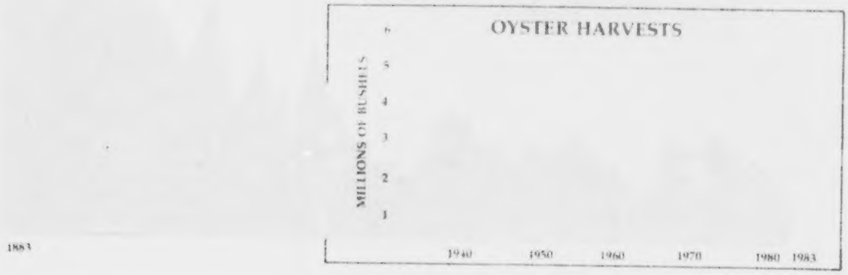
The result of this extensive planning effort was thirty-four legislative actions aimed at cleaning up the Chesapeake. These initiatives will lead to the control of pollution, the restoration of aquatic and land resources, the protection of shorelines from erosion and a significant reduction of sediment runoff. This Bay Program includes seven major program areas: point-source pollution control; nonpoint-source pollution control; resource restoration; protection of land resources; resource enhancement, monitoring, research and management.

The pages that follow give an overview of progress during 1984, the year that marked the exciting beginning of Maryland's Chesapeake Bay Program.

These graphs document the peaks and valleys of the Bay's seafood bounty. The 1960s and 70s saw new records for rockfish (striped bass), but that heyday has been followed by a precipitous decline. And the famed Chesapeake oyster has not seen a return of the last century's glorious harvests.







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Stopping Pollutants at Their Source

By the year 2000, the amount of wastewater processed in Maryland will be equivalent to nearly half the autumn flow of the Potomac River. Even now, in a year with average rainfall, some 146 million pounds of nitrogen and 14 million pounds of phosphorus pour into rivers and streams and into the Bay itself. Industries along Maryland's major rivers add several million pounds more of heavy metals, chemicals and organic and inorganic compounds to Bay-bound waters.

Our increasing understanding of water quality has led to more stringent limitations on just what can be discharged into the Bay by waste treatment plants and Maryland's diverse industries on both the eastern and western Bay shore. Because many plants cannot meet revised discharge restrictions with existing facilities, these facilities must be upgraded. In 1984, the state's Chesapeake Bay Program added $7.9 million of capital assistance funding to the previously authorized $49.8 million for projects such as advanced sewage treatment and loans to industry for pretreatment of waste.

While every treatment plant and every industry must demonstrate that its effluent discharges meet permit restrictions, the lack of adequate funding has hampered the state's rigorous monitoring and enforcement of those restrictions. Now, with Maryland's Bay Program and a new point source control initiative, comprehensive programs and regulations have been developed for more thorough surveillance of effluent discharges—and for more stringent prosecution of violators.

Industries, for example, that discharge effluents directly to publicly owned waste treatment plants must now pretreat effluents and meet new pretreatment requirements. The Office of Environmental Programs (OEP) initially identified thirty-four publicly owned plants receiving industrial discharges that may require pretreatment—twelve of these plants will definitely require industries to pretreat effluents, and twenty-two are now submitting inventories of industries that use their plants in order to clear the way for improved analysis and planning.

Some 700 industries in Maryland do not use waste treatment plants but treat effluents and release them directly into streams or ground waters. While all discharges must meet regulations set out in National Pollutant Discharge Elimination System (NPDES) permits, there has not been enough field support to monitor all industries. Now state inspectors will be able to monitor industrial discharges frequently enough to ensure compliance.

To help support the Bay Program, these industries will

Point-source pollution flows from a specific place—a sewage plant's pipe, an industry's outfall.

INITIATIVE A: POINT-SOURCE POLLUTION CONTROL PROGRAMS

PURPOSE: To reduce significantly the effects of effluent discharges from waste treatment plants and industry and to enhance enforcement of permit regulations.

A1: Capital funding assistance
A2: Point-source control programs
A3: Financial management of waste treatment plants
A4: Sewage dechlorination
A5: Upgrading of state waste treatment plants
A6: Use of suitable state lands for sludge products
A7: Use of innovative and alternative sewage systems
A8: Training of waste treatment plant operators
A9: Water quality planning for entire Chesapeake basin

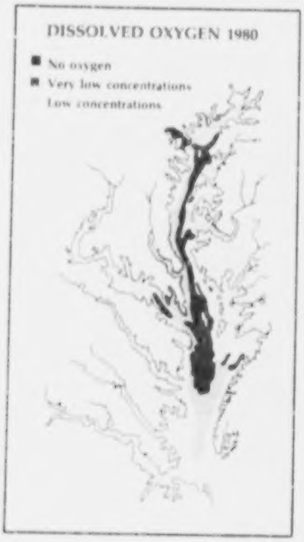
An excessive flow of nutrients into the Chesapeake has made it too rich for its own good. Blooms of algae have clouded its waters, and the dissolved oxygen necessary for life has diminished in the Bay's depths.

pay annual permit fees—estimated to bring in some $200,000 this year and $400,000 beginning in 1986—and application fees on the average of every five years (which are expected to account for an additional $80,000 a year). The permit fees will help cover the State's cost for a new biomonitoring program.

Biomonitoring helps to ensure that fisheries are not harmed by discharged effluents. Resource planners in the OEP have developed a biomonitoring and environmental testing program to measure the effects of industrial and municipal effluents on receiving waters. Shellfish or finfish in laboratory aquariums will be exposed to waters from discharge areas and their responses recorded. The University of Maryland at Baltimore, under contract to the OEP, will organize a network of research laboratories to enable scientists to analyze organisms damaged by those effluents. This information will then provide the basis for reevaluating levels of contaminants discharged by industries and waste treatment plants and for refining water quality standards and NPDES permit regulations.

With more than 400 waste treatment plants in Maryland alone—all of them monitored regularly and many of them being upgraded—the need for rigorous oversight of construction schedules, permit changes and sewage overflows during heavy rains becomes essential. A newly developed management approach for tracking and notifying permit violators is now in place. The State has submitted this plan to the Environmental Protection Agency and has begun to make use of civil penalties, citing three plants that had previously been warned for poor operations of existing facilities.

The point-source control program also includes a number of other initiatives. One calls for upgrading all state-owned waste treatment plants, bringing them into compliance with discharge standards, and implementing the use of sewage sludge for land use—for example, by composting the waste. The Maryland Environmental Service and the Maryland Forest, Park and Wildlife Service have developed a procedure for identifying state-owned lands suitable for sludge disposal; and the Baltimore City Department of Recreation and Parks, working with the Maryland Environmental Service, has agreed to a project in Druid Hill Park that will demonstrate the benefits of


DISSOLVED OXYGEN 1980

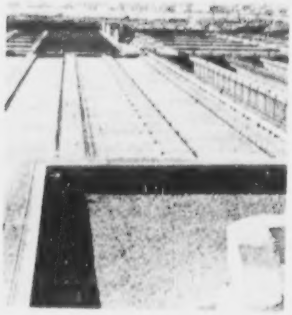
■ No oxygen
■ Very low concentrations
Low concentrations

composting with sewage sludge.

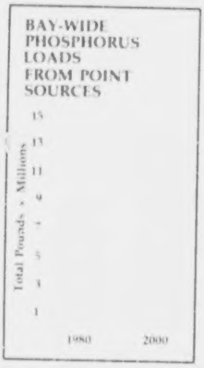
For years, most waste treatment plants have relied on chlorine to disinfect sewage effluents before discharging them into streams and rivers. We now know, however, that small concentrations of chlorine can be toxic to fish, especially at the larval stage. To minimize the effects of disinfection on aquatic organisms, all waste treatment plants that use chlorine must install dechlorination equipment by 1989. Of the 134 waste treatment plants in Maryland using chlorine, 68 are publicly owned and eligible for grants to cover 100 percent of the cost of installation. The Department of Health and Mental Hygiene will begin awarding construction grants by March, 1985. The move to decrease chlorine in our waters is well on its way.

Though conventional waste treatment facilities are designed to remove suspended solids, organic compounds and—with disinfection—disease-carrying microorganisms from wastewater, nutrients are another matter. Such plants, even at their most efficient, are inadequate for removing large amounts of nitrogen and phosphorus, the nutrients in waste that have been implicated by the EPA in the deterioration of Bay water quality. Both nitrogen and phosphorus, the EPA pointed out, provide an overenriched diet for blue-green algae, an enrichment which leads to a depletion of oxygen in bottom waters throughout the Bay—especially when the algae die and decay. To reduce concentrations of nutrients in treated wastewater demands "advanced secondary treatment"—processes that require containment of effluents for longer periods of time before discharge. This means greater capital construction costs and operational costs. To help reduce the impact of nutrients from certain treatment plants, the State will upgrade facilities in those river systems throughout Maryland's Bay where nutrient overloads appear to create water quality problems.

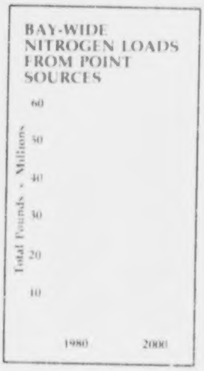
In certain areas of the estuary, then, the removal of nutrients from sewage will help slow the overenrichment of rivers. But in different areas, where nutrients and pollutants cannot be traced to a pipe, solutions must focus on sources other than industry and waste treatment plants—on what are often called "nonpoint" sources, where pollutants come from the very land itself.



To help keep Bay waters healthier and cleaner, waste treatment plants will remove chlorine and, in many cases, nutrients from treated wastes.

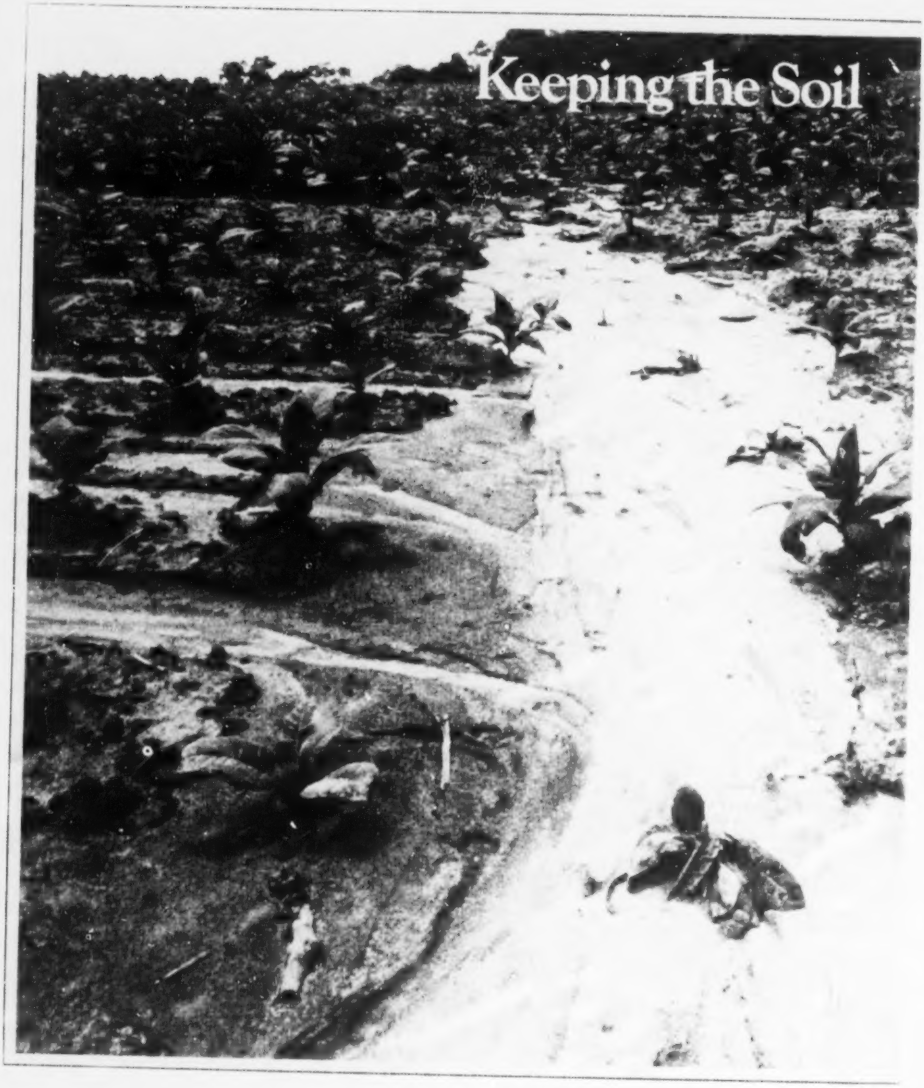


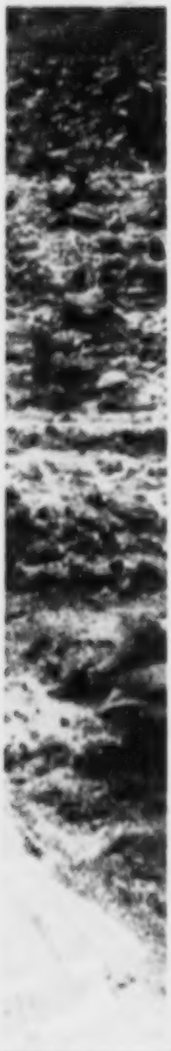
BAY-WIDE PHOSPHORUS LOADS FROM POINT SOURCES



BAY-WIDE NITROGEN LOADS FROM POINT SOURCES

These projections of increased nutrients assume no changes or controls for the future. New programs will make a difference. Though tough questions about the real effects of nitrogen on the Bay still remain.


Keeping the Soil



Out of the Water

In 1972, the day after Hurricane Agnes blasted the Bay with high winds and unbelievably heavy rains, Lloyd Allen realized his farm looked different. A quick stroll showed the damage: the storm had opened up deep gullies that led down to the nearby Sassafras River. From one field alone Allen estimates that he lost one-quarter acre overnight.

This was not simply the loss of topsoil. The gullies, some as much as twenty feet deep or more, had literally swallowed up parts of fields, the pride of a 500-acre Eastern Shore farm. Not only that, but the soil stripped from the farm went on to cause more destruction—in the Chesapeake Bay, where sediments clouded the estuary's clear waters and blocked light below its surface.

As time passed, the gullies grew, the land eroded, the river received more silt. From an airplane you could see, during a heavy rain storm, plumes of sediment-laden runoff sweeping out of the gullies into the Sassafras. Agnes, it seems, had accelerated an already troublesome erosion process by washing out honeysuckle and other ground cover from these gashes. Old tires and debris thrown into the heads of the ravines couldn't stop the destruction.

That the soil should be leaving Lloyd Allen's farm seemed especially unfair. Allen had been a leader in the use of a number of modern agricultural practices, including no-till farming. He had done many of the "right things" to keep topsoil on his farm and to keep runoff out of the river. But the gully problem was a tough one.

"We just didn't have the money to deal with this," Allen says. "Then the state came up with this cost-share program."

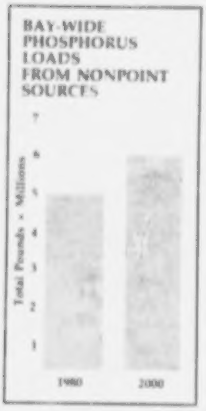
When funds became available, Allen leaped at the chance to make improvements. In fact, he was the first farmer in

Many of the pollutants entering the Chesapeake Bay do not come from a pipe. They come from all over—from farm land, suburban development and urban centers. All of this we call "nonpoint-source pollution." Cleaning it up is a job for everyone.

**INITIATIVE B:
NONPOINT-SOURCE POLLUTION
CONTROL PROGRAM**

PURPOSE: To keep the land and everything on it—chemicals, fertilizer, topsoil, petroleum residue—from entering the Chesapeake Bay in amounts large enough to degrade the health of the ecosystem.

B1: State agricultural soil and water conservation program
B2: Enforcement of agricultural nonpoint-source pollution
B3: Enforcement of erosion and sediment control plans
B4: Stormwater management
B5: Best Management Practices for existing urban areas
B6: Shoreline erosion
B7: Agricultural drainage
B8: Water quality certification program


BAY-WIDE PHOSPHORUS LOADS FROM NONPOINT SOURCES

Nutrients come from both point sources and nonpoint sources. To clean the Bay we must control both.

the state to put in an application for grants made possible by Maryland's new Agriculture Cost-Share Program. It now looks as if he will take full advantage of the $25,000 allowed per farm for pollution control.

The solutions have been costly and complex. With financial help from the state and technical help from the Soil Conservation District, Allen created grass waterways and terraces on his farm and has set up a number of "drop structures." The grass waterways help trap runoff, just as the terraces help reduce it; the drop structures funnel remaining flow into pipes, leading it away from the soft gully sides to piles of rocks below that act as sediment traps. The funnel, an imposing structure, is made of aluminum—"That's the expensive part," Allen says. The rocks below may be piled four feet high, though Allen reports that since the system was installed, some two feet of sediment have collected, now making one rock pile half as high. "If this keeps up," Allen jokes, "some day the soil will pile all the way back up to the level of the field."

Have such efforts helped the Bay?

Yes, says Beth Horsey, manager of the local Soil Conservation District. "You can see results already," she reports. Plans are underway, she says, for some very direct monitoring to confirm what is already apparent to the eye: that the waters are cleaner, clearer. This is especially significant in the Sassafras, where some 200 gullies opened up during Agnes' fury—and where anadromous species, including the troubled rockfish, spawn each early spring.

And how does Lloyd Allen feel about this?

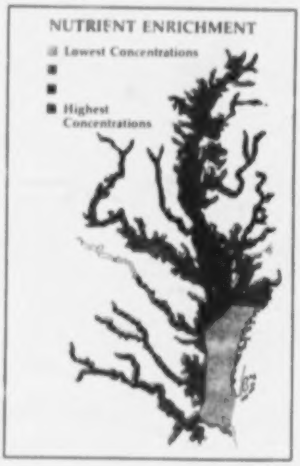
"It's a great thing they're pushing this," he says, "and not just letting nature take its course. After all, I may be a farmer but I like the water too. I'm all for it."

Allen's farm is only one place where Maryland's Chesapeake Bay Program is making a difference.

Thanks to such cost-sharing programs, other farmers are also able to employ new "best management practices." According to officials at the Maryland Department of Agriculture, 1,700 applications have come from around the state. Of these, 1,500 have been approved and some 500 have already been implemented. A remarkable record for so new an effort.

Under the Bay Program, a concentrated drive has identified the crucial "priority watersheds" in the Bay region—areas which require special attention to stop soil runoff. Agricultural experts have now identified ten of these priority areas, many of which are far from the Bay shore but near streams and rivers where runoff of soil and fertilizer begins.

The assistance program described here is only one of eight initiatives aimed at stopping nonpoint-source pollution, identified by the Environmental Protection Agency as a major contributor to the Bay's decline. Since runoff comes from places other than farm fields, several programs focus on urban areas as well—on


NUTRIENT ENRICHMENT

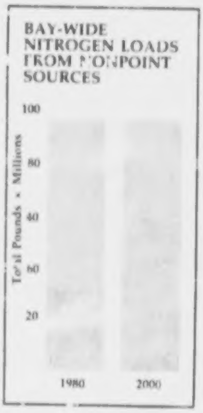
stormwater management and on activities that could affect Bay water quality: public drainage projects, marina construction, major bulkheading projects and various dredging activities.

Where stormwater control is concerned, for example, the Maryland Bay Program has provided additional support for the Department of Natural Resources' Water Resources Administration to enforce a stormwater law first passed in 1982. This law requires that streams be just as clear after the completion of nearby construction projects as they were before construction took place. And this must be the case even after storms so severe that they occur only once in ten years. For certain crucial areas, such as the Jones Falls area, streams must meet these standards even after so-called 100-year storms.

To help meet goals for stormwater control, the Maryland Bay Program has now made available $1.7 million in implementation grants to local areas with identified problems.

As well as guarding against the ill effects of stormwater runoff, the State also directs a broader sediment control plan. That plan, established a decade ago, has faced the difficulty of assuring adequate inspections by all the different counties throughout the state. With the implementation of the Maryland Bay Program, authority for enforcing sediment control passed from the counties directly to the DNR. If counties or cities wish to retain control over these programs, they can petition the State to delegate that authority back to them—though they must prove that they have, within the county, the staff and the programs to do the job. In response to this option, a number of counties have increased their sediment control staff, and sediment—largely from development and construction—has already been decreased.

All these programs, operating primarily through the Department of Natural Resources, the Department of Agriculture and the Soil Conservation Districts, are making concerted efforts to stop nonpoint-source pollution where it starts: on the farms, lawns and streets of the Chesapeake's watershed.



While point-source loads of nitrogen will increase, nonpoint-source loads are expected to level out. This is because acreage of farmland will not increase in the coming decades. Nitrogen loads, however, are already very high.

Cities and suburbs—and not just farmlands—generate nonpoint-source pollution. Plans call for "best management practices" in our cities as well as on our farms.

Bringing

On a crisp autumn morning a Chesapeake oysterman balances above waters that appear as serene and placid as they always have. But beneath the calm surface another scene unfolds. Areas formerly vegetated by underwater grasses now lie barren. Patches of hard bottom, the oyster bars, are scarce. Rockfish, once dominant, have become the Bay's stragglers. Overhead, too, a similar story unfolds. Canvasbacks, redheads and black ducks no longer return to the Bay in their former numbers. And pintails and widgeons hardly come back at all.

Embodied in the Maryland Chesapeake Bay Program is the realization that we have not always been responsible stewards of our resources. There are, most agree, reparations we must pay to reverse generations of misunderstanding or neglect.

Evidences of a current decline are many, but few are so striking as the disappearance of the lush underwater grasses that once graced the bottom of the Bay. As recently as 1965, for example, submerged aquatic plants covered hundreds of thousands of acres of Bay bottom. Today they have retreated to a mere 10 thousand acres. And with that retreat has come the loss of protective habitat for small fish, crabs and snails, the loss of important food sources for waterfowl and aquatic mammals and the loss of oxygen through photosynthesis for bottom waters.

A return of the grasses will depend on a number of factors. Studies by the Environmental Protection Agency showed strong correlations between the decline of grasses and the presence of excessive nutrients. So while efforts are under way to retard entry into the Bay of nutrients from waste

Back the Bay's Bounty

treatment plants and land runoff, ongoing studies by the Coastal Resources Division of the Department of Natural Resources are now exploring the possibilities of replanting grasses to help speed their regeneration.

One effort at replanting Bay grasses has been spearheaded by Dr. Stan Kohler of the Harford Community College. You can frequently find Dr. Kohler up to his waist in Bay water on the Susquehanna Flats. His method is simply this: wait for low tide, hold your breath, dive three or four feet to the muddy bottom, scrape away the sediment and insert a plug of Bay grass. It is a slow and laborious process—and until now, only Dr. Kohler and two students have been involved in the effort. Because of the Resource Restoration Initiative, aid is on the way in the form of more student help and better equipment. The initiative also provides funding for growing more grasses in the College's greenhouse.

Farther down the Bay similar efforts are under way. The National Marine Fisheries Service's Laboratory at Oxford has offered the use of siltation ponds, ponds that the Department of Natural Resources is hoping will be next year's Bay grass nursery. With a graduate student from the University of Maryland's Horn Point Environmental Laboratory, Dr. Christopher Zabawa of DNR's Coastal Resources Division will be growing grasses and planting them in the Choptank River.

On the western shore, researchers at Johns Hopkins University will analyze pollen and sediments for evidence that will tell them which particular grasses require special conditions for growth—information that should allow more efficient nursery production.

The Maryland Chesapeake Bay Program is the seed of these first efforts at growing grasses. Program funding over the next two years will demonstrate the feasibility of extensive plantings—and whether we can look forward to a Bay rimmed with lush meadows of underwater grasses.

The restoration of Bay grasses is not the State's only effort to bring back the Chesapeake's former vitality. Experiments in the use of hatcheries will help determine new ways to restore diminished stocks of rockfish, black ducks and oysters. Hatchery feasibility studies and site selection are now in progress, as resource managers and researchers address a task of difficult logistical and biological questions.

Already well under way are efforts to reverse the recent decline in oyster harvests. This year, as a result of funding from Maryland's Chesapeake Bay Program, the Department of Natural Resources has:

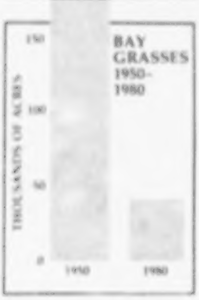
- nearly doubled the planting of dredged shell;
- planted 110,000 bushels of fresh shell;
- conducted experiments to determine if divers can plant eyed oyster larvae directly on natural bars;
- planted 48,000 bushels of oyster seed on 132 acres of Bay bottom;
- prepared to clear the ground for rebuilding the Deal Island oyster hatchery.

All of the efforts under this initiative aim at one end: working—in the best way we know how—to bring back the plants and animals that have historically made the Chesapeake Bay the queen of estuaries.

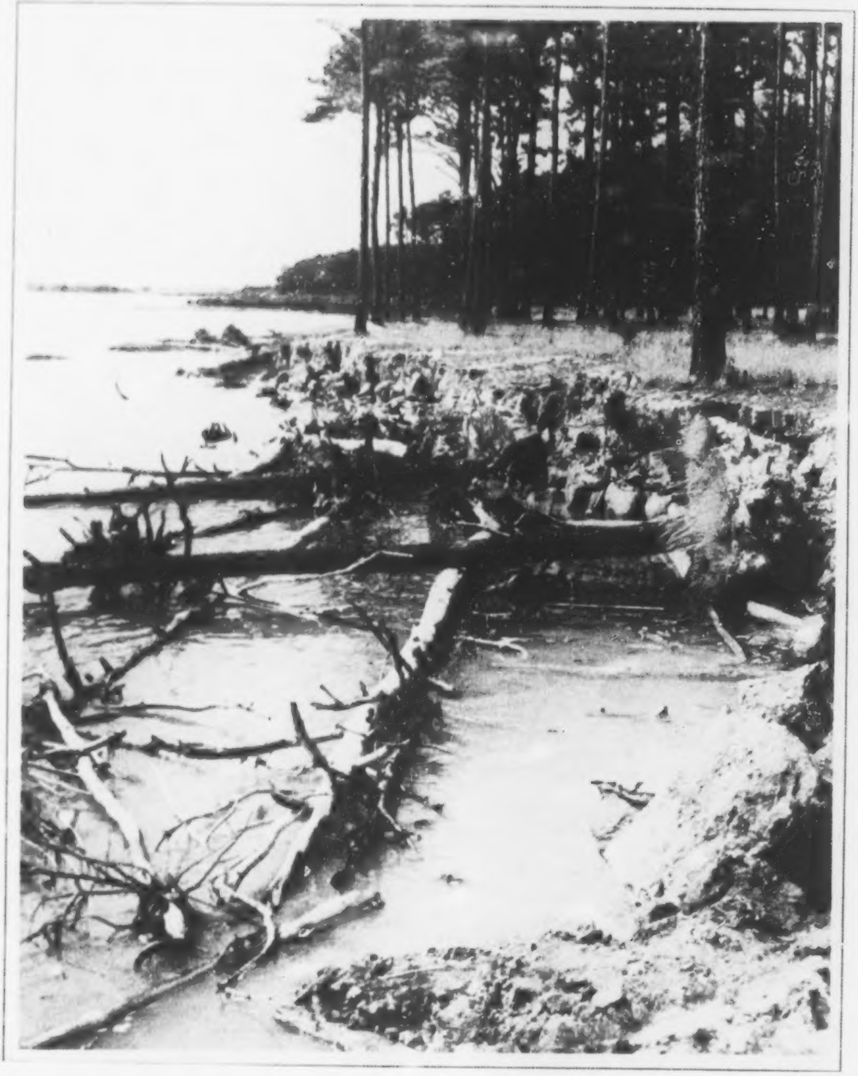
INITIATIVE C: RESOURCE RESTORATION

PURPOSE: To improve Bay health and productivity by returning biologically and commercially important species to former levels of abundance.

C1: Revegetation of submerged plants
C2: Oyster repletion and culture
C3: Finfish hatchery
C4: Duck habitat restoration and culture



Before the great sea grass decline of the 1970s, we did not know exactly how much underwater vegetation was in the Bay—we only knew it was a lot, some several hundred thousand acres. The decline to only 40,000 acres by 1980 served as an early warning signal that the Chesapeake was in trouble.



Helping the Land Save the Bay

Dramatic changes have come to the Chesapeake basin, especially over the last thirty years. Whole towns now stand where woodlands stood for centuries, and urban expansion continues to consume cropland. Already we have converted fully 15% of the Chesapeake's watershed lands from farms and forests to homes and highrises, a 182% increase since 1950. And the Bay can feel the difference.

Research suggests distinct correlations between land conversion and water quality problems now evident throughout the Chesapeake. The runoff of sediment, nutrients and toxics, for example, accelerated by land development, continues to take its toll on the Bay's once clear waters. And now that we understand the real effects of land conversion, it becomes essential to preserve those natural systems that still remain around the estuary.

Woodlands and wetlands, in particular, are the primary buffers that naturally absorb, subdue and filter land runoff. To conserve what remains of these crucial tempering resources, Maryland's Chesapeake Bay Program designated a "critical area"—which includes a 1,000-foot strip landward from the head of tide and all land beneath the Bay—within which to implement enlightened and innovative management plans.

A key element in developing these plans is the Chesapeake Bay Critical Areas Commission. The Commission's purpose, quite simply, is to protect shoreline areas and inshore waters against further degradation from new land development.

With state and local participation, this 25-member body will recommend regulations, subject to approval by the General Assembly, which local jurisdictions follow as they develop their own protection plans within the 1,000-foot shoreline strip. Following Commission approval, local jurisdictions will implement and enforce their protection plans as they would any local regulation.

The Critical Areas Commission has conducted a series of hearings to solicit public comment on general criteria for protection plans. At each hearing an average of 40 people signed up to speak in support of the program, and the Commission has received additional written comments offering constructive suggestions and favorable comments. Under those guidelines, localities must consider any adverse effects of development on water quality and habitat, and must establish land use policies for the critical zone.

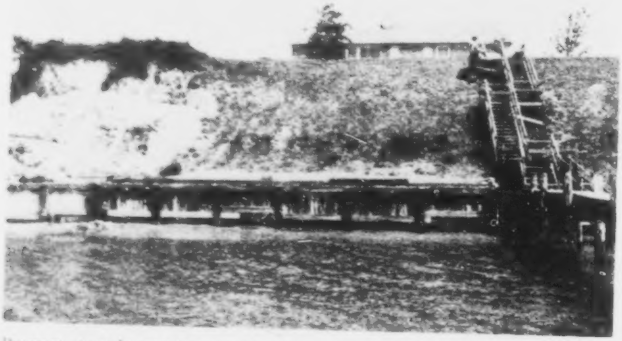
To support the cost of protecting and enhancing publicly owned property within the critical zone, the Shoreline Improvement Loan Fund, established as part of the state's Bay

INITIATIVE D:
PROTECTION OF
LAND RESOURCES

PURPOSE: To implement cooperative programs at state, county, local and private levels for protecting Maryland's shorelines and wetlands.

D1: Critical Areas Commission
D2: Nontidal wetlands
D3: Conservation easement program
D4: Retention of existing forestland

Around the Bay shore and beneath its tidal waters lies a critical zone that requires special care.



The land around the Bay has changed. Pasturelands and croplands are receding; homes and highrises are spreading. Between 1973 and 1981 Maryland lost almost 80,000 acres of farms and forests.

Program, provides matching grants to support 75% of the cost of improvement programs.

"The Improvement Fund is set up to provide assistance where other state programs leave off," says Patricia Funk of the Department of Natural Resources' Coastal Resources Division. "We can fund projects for urban waterfront redevelopment, for example, or shoreline stablization through plantings rather than structural means." The Shoreline Improvement Program can help in a number of ways, including debris clean-up, public access improvement and environmental education projects—as long as they enhance the shoreline.

The Bay Program has also enabled the Maryland Environmental Trust to expand its well-established conservation easement program, which allows private owners of undeveloped or low-density land to make individual contributions to protecting the Bay. Through a perpetual deed-of-easement, owners ensure that the land will never be developed, though they retain ownership and use of the land as before, whether as a residence, farm or woodlands. The Trust's goal is to include 1,000 acres of land in the critical zone annually. "On the Bay, we're working with such organizations as the Chesapeake Bay Foundation and the Chester Sassafras Foundation to ferret out easement donors," says Trust Executive Director, Robert Beckett. "And we are beginning to find that the easements we already have in the critical area are acting as magnets for owners of adjacent lands," he says. "What I think we'll see in the future are what you might call privately held preserves along the Bay shore that will be maintained by the owners in ways that are consistent with open space conservation." Beckett reports that in 1984 the Trust negotiated easements for more than 1,300 acres in the critical area, a major step in preserving the Bay's buffer zones and guarding against further nonpoint-source pollution.

While woodlands in these critical areas provide a natural buffer zone filtering surface water and absorbing runoff, only 900 miles of the Bay's shoreline remains forested today. To protect what is left, the DNR's Department of Forests, Parks and Woodlands is now mapping forest buffers. By matching current topographical maps with recent high-altitude photography, managers will have an accurate inventory which, once computerized, will allow them to spot growth or decline of forest buffer zones.

As mapping progresses, foresters are working at the local level, explaining the importance of buffer zones to landowners and assisting local jurisdictions in developing their own forest management plans.

If the loss of forestlands is alarming, so too is the decline of nontidal wetlands. From 1963 to 1983, the Chesapeake Bay region lost some 14,000 acres of nontidal wetlands. These transitional environments are critical for flood control and for maintaining water quality and wildlife habitat.

"Agricultural drainage is the number one cause of nontidal wetlands loss," reports David Burke of the Coastal Resources Division. "That's why, as one of our first tasks under the Bay Program, we are developing wetland mitigation criteria for public drainage associations."

To halt further loss of nontidal wetlands, the DNR, in cooperation with the U.S. Fish and Wildlife Service and its National Wetlands Inventory, is mapping the nontidal wetlands that remain. Once translated into a numerical scheme or "digitized," the inventory will be analyzed by computer.

"We want to know the locations and extent of these wetlands," Burke says, "and we want to be able to break them down, statewide, by watershed or by county. That information is essential for making the kind of wetland protection plans that will check the decline of these important areas."

The DNR conducted a series of three-part workshops for local planners and technicians to enable them to identify and characterize nontidal wetlands in their jurisdictions. Already the program has replaced a Calvert County wetland lost to highway construction with a forest swamp that will eventually become a county park used for environmental education.

The message seems clear enough: To save the Bay, we must first save the marshes and the forests.

To save the Bay, we must protect the land. Woodlands and wetlands are the Bay's primary buffers—absorbing and filtering land runoff.

20

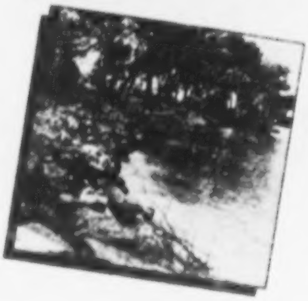
Working Together to Better the Bay

There is an old saying that those who don't move forward move backward. In the same spirit, some have argued that it is not enough simply to restore the Chesapeake's resources—we must enhance them.

That resolve has led to positive action by the state's resource managers, action that focuses on improving the Bay's marshes and shoreline—and on its troubled fisheries. Some of those efforts have benefited our youth as well, providing them with both training and experience. Snapshots of last summer's Bay enhancement efforts include the following:

- At Herring Run, crews of Baltimore inner city youth spent eight weeks during July and August removing junked tires, stabilizing banks, installing rip rap, replanting marsh grass, and mulching trees and shrubbery around the shoreline.
- At the Elkton Fish Hatchery on the Susquehanna River, a crew of eight refurbished fish ponds that can now be used for spawning rockfish.
- At Assateague, boys and girls from Worcester County installed 5,000 feet of sand fencing and planted 25,000 beach grass plants.
- At Fort Frederick in Washington County students installed railroad ties and built swales from stone and concrete to prevent erosion.

Altogether 726 participants between the ages of 14 and 21—from sixteen different counties—worked to improve specific sites throughout the Bay watershed. Their summer labors were part of an eight-week Maryland Conservation Corps program aimed at restoring natural resource habitats while providing employment for disadvantaged youth. All told, some 74 projects involving the MCC have been completed this year.



INITIATIVE E:
RESOURCE ENHANCEMENT

PURPOSE: To enhance habitats throughout Maryland's Bay watershed and to encourage and develop commercial and sport fisheries.

E1: Recreational fishing
E2: Freshwater conservation
E3: Maryland Conservation Corps
E4: Fisheries management program

In order to make this an educational program, one day was set aside in each case to teach participants a little about the ecology of the Chesapeake Bay and a little about the benefits of the jobs they were doing. At many sites this daily educational process continued as the work went on.

Because of this program, the state could take advantage of federal funds through the Job Training Partnership Act and could complete projects that would otherwise have gone undone. Supervisors of the program concluded that for every $1.00 the State spent on the MCC, they got back $1.63 worth of labor and help.

Perhaps the best measure of the success of the program comes from the students themselves: more than 75 percent of them felt they had gained valuable work habits, and more than 70 percent said they had learned something new about the Chesapeake Bay.

Another way the citizens of Maryland can participate directly in the support of the Bay clean-up effort is through the funds they pay for a new salt water fishing license—funds that will add an estimated $1,838,000 to the Bay effort. Those funds will allow a number of projects aimed at enhancing Bay fisheries: protection, monitoring and evaluation of fish habitat, plus special research on specific fisheries. One project will estimate populations of sportfish and start a tagging program for fish produced in hatcheries. Another project will help improve fishing in municipal areas—for example, turning the soon-to-be-retired Emerson Harrington Bridge on the Choptank River into a major fishing pier.

Enhancement of the Chesapeake's commercial and recreational fisheries will not be easy. It will require decision making that can balance complex factors—ecological and social—affecting the availability of important

Enhancing the Bay's commercial and recreational fisheries will mean balancing both social and ecological concerns.

species. To provide the basis for such a management approach, the Department of Natural Resources is developing comprehensive plans for major Bay species. These plans will provide resource managers with the available information on each species' biology, habitat requirements, growth, mortality and population dynamics. The plans will also help pinpoint specific research needs and further increase the information needed to reach important resource management decisions.

Under way are initial reviews of available data bases for the American shad, hickory shad and herring. Nearly complete is the rockfish management plan which brings together the most current data on this species' population dynamics and expected yields and the implications of restricting commercial and recreational fishing. On the basis of these data, the DNR determined in 1984 that the rockfish is a threatened species and has therefore instituted a moratorium prohibiting all fishing for rockfish in Maryland's portion of the Chesapeake Bay.

The intent of the moratorium is to allow greater spawning success of the natural population; at the same time, the DNR is developing plans that will further enhance the survival of young rockfish. Site evaluations are now in progress for the placement of an "intercept" hatchery, where the rockfish will be artificially spawned. The hatchery will release an estimated two and a half million fingerlings into the estuary each year. To evaluate the effectiveness of this program, hatchery operators will freeze-brand the fish, a tagging method that will allow later identification.

Approaching the challenge of resource enhancement from many fronts, these efforts will help improve those things that we all enjoy about the Bay: access to a stable shoreline and to fishing piers—and a better chance at catching fish once we get there.

The Emerson Harrington Bridge on the Choptank will become a major fishing pier.

Teaching

This year has seen a remarkable effort on the part of the Chesapeake Bay states to save a priceless resource. And plans are in full swing for the coming year. But what of the future? Not only two or three years into the future but ten years? Twenty years? How can we be certain that the next generation will understand the value of our concerted efforts to restore the Chesapeake to its former health?

The future, of course, lies in the hands of our children. And to help them appreciate the special worth of our estuarine resources—for fisheries, for shipping, for recreation—the Chesapeake Bay Program is providing special environmental education opportunities for these citizens of tomorrow.

Through the State Department of Education, new and expanded programs give students the chance to see the Chesapeake firsthand. The Chesapeake Bay Foundation, a private environmental group with years of experience in field education, is doubling its efforts to expose students and teachers to the Bay—whether exploring tributaries in canoes, tromping through marshes on foot or taking to the bigger rivers and the Bay aboard larger boats, such as the Foundation's own *Osprey*.

Good environmental education always depends upon good teaching. To inform teachers about Bay-related subjects, the State is helping to stage a number of teacher training workshops. One of these training efforts will teach educators to use a simulation model developed at the University of Maryland Science Teaching Center. The simulation game focuses on the many different users of the Bay—and on the ways in which a democratic process solves complex

Our Children Well

questions that face decision makers. Since the game demands a working knowledge of Bay resources and problems, students learn about estuarine science and policy making at the same time.

Another teacher training effort focuses on leadership. Through a summer leadership program—and a follow-up program during the school year—the state will help prepare teams of environmental educators who will in turn train other teachers in Bay-related subjects. This program has begun in southern Maryland and will continue in every region of the state, assuring a strong group of Bay educators in every school system.

One education initiative takes full advantage of the creative minds in each school system by allowing teachers and administrators to prepare their own proposals for Chesapeake Bay-related education efforts. One such proposal comes from the shores of a troubled western shore tributary.

The Big Gunpowder Falls River cuts through Baltimore County from Pennsylvania to the Bay. Like many rivers in the Chesapeake drainage basin, it has felt the effects of agricultural, urban and suburban development. Now, thanks to this environmental education initiative, there will be at least one local group keeping a close eye on the Gunpowder. That group comprises twenty schools in Baltimore County, both teachers and students with a commitment to clean up their small part of the Chesapeake.

Over a two-year period, these twenty schools will look at the effects of runoff, urbanization and damming on the Gunpowder. For example, some streams, they fear, may have been dried up by the Loch Raven Dam. The schools will focus directly on the quality of spawning habitats for fish and try to gauge which species reproduce successfully there. The schools will also examine water quality and perform coliform counts to estimate populations of bacteria that might be in the river.

Similar projects are taking place around the state thanks to eleven grants awarded by the State Department of Education. In the Choptank River basin, for example, the school systems of three counties—Talbot, Caroline and Dorchester—have joined together to focus attention on that one river. "One important thing about the Choptank project," says Gary Heath, State Education Department coordinator for environmental programs, "is that it approaches the river as a total watershed, not just as a part of one particular county."

The big benefit of these projects will come in the form of attitude changes and changes in perception. Often there is no special slot set aside in a school's curriculum for environmental education. What tends to happen as a result of special efforts such as those described here is what Heath calls "infusion" of environmental concern into all subjects. Whether in English, social studies or science, schools come to reinforce the idea that our environment is not something to take for granted, but something to value and protect—far into the future.

INITIATIVE F: ENVIRONMENTAL EDUCATION

PURPOSE: To teach future generations of Marylanders about the complexity and value of the Chesapeake Bay. The elements of this initiative are:

- Project direction for environmental education programs
- Grants to local school systems for environmental education projects and curricula
- Estuarine field studies program to provide students with first-hand experience of Bay ecology
- Teacher training program to enhance quality of Chesapeake Bay-related instruction

Give a child a fish, and he will have food for one day. Teach a child to fish and he will have food for a lifetime.

—Chinese proverb

The Bay's Early Warning System

The Latin root of monitor, *monere*, means to warn. And for the Chesapeake Bay, monitoring serves as an early warning system, a system that alerts us to the quality of estuarine waters and to the health of living resources. Monitoring also tells us how effective our decisions are, as we try to reverse harmful trends—and whether there is a need for altering our management strategies.

The Department of Health and Mental Hygiene's Office of Environmental Programs (OEP) and the Department of Natural Resources are working together to head up such early warning systems. They are assessing changes and the effects of changes—OEP in water quality and DNR in specific biological resources. Their laboratory is Maryland's portion of the Chesapeake Bay and their job is complex—they must determine when a pollutant is in excess and if it is harmful. Consider, as an example, a single element—zinc—and a single animal—the oyster.

Concentrations of zinc fluctuate daily with the tides and periodically with rainfall and other natural and manmade factors. How much zinc is normal, how much is too much? Only long-term monitoring can answer these questions by finding patterns and by sifting out variations in patterns of zinc concentration throughout the estuary. In the case of zinc there is evidence of increasing concentrations in Bay waters.

Oysters, which are in serious decline, have also been accumulating increased concentrations of zinc. Is zinc responsible for the decline? Perhaps. But other metals or compounds may be having a greater effect. Or perhaps a combination of toxics is responsible. To sort through such possibilities, researchers depend on monitoring. Without careful and regular monitoring, there is only educated guesswork.

In addition to water quality analysis, scientists and technicians from the OEP periodically collect sediment and tissue samples to make numerous routine measurements, among them concentrations of metals, including zinc. By taking tissue samples, technicians rely on estuarine organisms that live and drink and breathe the Chesapeake's water and whatever is in it. These are the biomonitors, the living creatures that, by filtering the estuary's waters through their tissues, give us a record of what its waters contain.

Maryland's long-term monitoring programs have been greatly enhanced by funding from the state's Chesapeake Bay Program—since July, the OEP has started phasing in 44 sampling sites that will significantly enlarge the coverage

INITIATIVE G:
MONITORING AND RESEARCH

PURPOSE: To guide sound management of the Chesapeake Bay by monitoring its physical and biological health and by encouraging appropriate and reliable research.

G1: Regional Data Center
G2: Water quality and species-specific monitoring
G3: Support for research and management

Twenty times a year research vessels like the University of Maryland's *Aquarius* set out to monitor the health of the Bay...

now provided by 22 EPA-funded sites in the mainstem Bay.

Twenty times per year (twice per month from March through November, once per month from December to February) OEP technicians onboard the University of Maryland's research vessels, *Aquarius* or *Orion*, sail the mainstem Chesapeake for three days at a stretch, taking samples from the mouth of the Potomac on up to the Susquehanna Flats. Along the way, researchers retrieve the organisms that serve as passive biomonitors, front-line troops in the early warning system. Among their interests:

- the distribution of microscopic plants and animals and bottom-dwelling organisms such as clams and worms;
- the relation between toxics and sediments—the measure of concentrations of toxic chemicals in the sediments and in the organisms found there;
- the nature of "ecosystem processes"—an umbrella term for naturally occurring cycles in the estuary, such as nitrogen exchange and sedimentation.

The importance of all this monitoring is to establish a baseline from which to judge the effectiveness of management decisions. Collected data are sent to a Regional Data Center, a valuable legacy from the EPA's six-year Chesapeake Bay Program. Virginia, Pennsylvania and Maryland, in cooperation with the EPA, have expanded the Center, in part through funding from Maryland's Bay Program, to receive monitoring results for storage and interpretation, and as a guide for future research.

While the Department of Health makes these assessments, the Department of Natural Resources monitors habitat quality—but with an eye toward the health of particular species, such as the rockfish. One current question centers on the factors that influence the rockfish's reproductive success. Again, part of that answer must come from monitoring.

Among the factors under consideration—those being monitored during the spring spawning run—are species abundance (adults, juveniles and larvae), acidity, temperature and toxic chemicals. Already there are fruits from this effort: as long suspected but unproved, concentrations of pesticides and herbicides in rockfish spawning areas are considerably greater following rainfall.

The effort to monitor the Bay's living resources—specifically the health and abundance of prominent species—initially focused on rockfish but will extend to other commercially important species as well. The Department of Natural Resources is now beginning a long-term stock assessment program of various life stages of these species. The data from this effort, which is funded in part by EPA and the National Oceanic and Atmospheric Administration (NOAA), will form the baseline of an early warning system that will judge the effectiveness of pollution control programs and will detect subtle changes in stocks at an earlier stage than is now possible.

Monitoring, then, that early warning system, tells us of the quality of the Bay's resources, alerts us to potential problems and helps us to evaluate the effectiveness of management strategies. But if by having monitored we discover, for example, those increased concentrations of zinc, how do we know whether they are harmful? The answer must come from research.

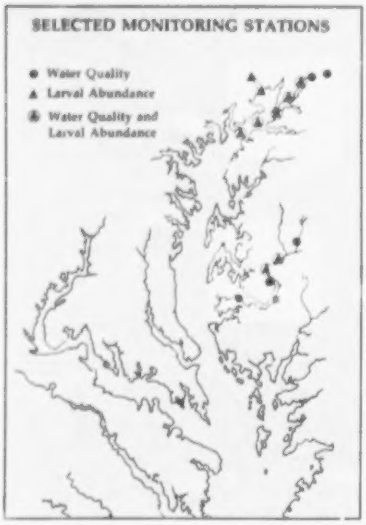
Monitoring will alert the management agencies to research needs. And, as a result of funding by Maryland's Bay Program, a mechanism is now in place to better connect management needs to research goals.

The nexus of that mechanism is the Governor's Council on the Bay. The Council is composed of the Secretaries of the following agencies: the Department of Natural Resources; the Office of Environmental Programs, Department of Health and Mental Hygiene; the Department of Agriculture; and the Department of State Planning, as well as the President of the University of Maryland. Staff from the Governor's Office will coordinate the activities of the Council, which will provide regular reports and advice to the Governor on the Maryland Chesapeake Bay Program.

The research program currently concentrates on seven projects. These include two projects in OEP (mathematical modelling of the Patuxent estuary and estuarine carbon cycling), one in the Department of Agriculture (nutrient cycling on land) and four in the Department of Natural Resources (storm water management, survey of organotin, hydrilla literature search and effects of white perch fishery techniques on rockfish). An eighth research project, to be funded by proceeds from the salt water fishing license, will focus on physical factors that affect spawning of rockfish and white perch.

It is through monitoring's early warning system and the guidance provided by research that we can best judge the effectiveness of our efforts and make the wisest decisions for the future of the Chesapeake.

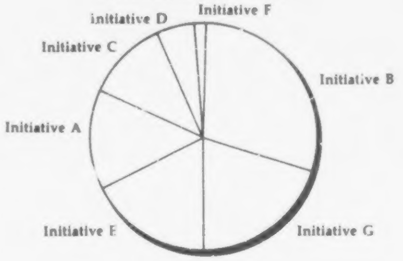
. . . what they find a is a host of complex elements: nutrients, organic compounds and heavy metals.


SELECTED MONITORING STATIONS
● Water Quality
▲ Larval Abundance
Water Quality and Larval Abundance

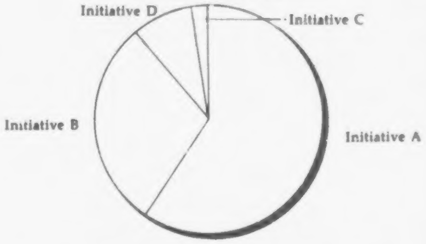
Monitoring takes place at vital areas all over the Chesapeake. Highlighted here are two areas—the Choptank and the Upper Bay—where both water quality and species are monitored. Other tests are also underway: in the Chesapeake and Delaware Canal the National Oceanic and Atmospheric Administration is carefully tracking tidal currents.

BUDGETING FOR THE BAY

OPERATING COSTS



CAPITAL COSTS



MARYLAND CHESAPEAKE BAY PROGRAM 1984* BUDGET

INITIATIVE	OPERATING COSTS	CAPITAL COSTS
A: Point-Source Pollution	1,610,721	13,900,000
B: Nonpoint-Source Pollution	4,036,094	6,750,000
C: Resource Restoration	1,924,320	550,000
D: Land Resource Protection	654,735	2,000,000
E: Resource Management	2,471,267	0
F: Environmental Education	277,000	0
G: Monitoring and Research	2,774,422	0

*Fiscal 1985 (July, 1984–June, 1985)

What's Ahead

The momentum to clean up the Chesapeake continues. Both in Maryland and in the entire Chesapeake region, 1985 will see the continuation of an aggressive effort to make Bay waters cleaner and Baylife more abundant.

The second year of the Maryland Bay Program will bring added support to the Office of Environmental Programs for the control of point-source pollution. More field support will join the Department of Agriculture to improve nonpoint-source pollution controls. During 1985, too, the Department of Natural Resources will continue to devise fisheries management plans and will work to improve stocks of important Bay fish and shellfish.

As well as operational funding for the above activities, the second year of the State's Bay Program provides for capital expenditures for most of the initiatives. There are state funds to match support from the Environmental Protection Agency for local governments to upgrade treatment plants. There will be a continuation of loans for industries to pretreat waste and of cost-share programs for farmers to install "best management practices." There are also funds to aid in the dechlorination of treated sewage, to help property owners control shoreline erosion and to construct a major rockfish hatchery.

On the regional level, 1985 will see continued Bay programs in Virginia and Pennsylvania, as well as in Maryland. In 1984, Virginia appropriated some $13 million for the Bay clean-up effort, and Pennsylvania appropriated

for Maryland's Bay Program

some $2 million. The Chesapeake Executive Council, composed of cabinet members designated by the governors of the three participating states, the Mayor of Washington, D.C., and the Regional Administrator of the EPA, will continue to oversee this region-wide effort.

The campaign to restore the Chesapeake Bay has brought together a great many experts and civic leaders. To help provide the Executive Council with technical information and recommendations, the Bay Program makes use of an Implementation Committee which receives information and advice from the following subcommittees: Research and Modeling, Data Management, Planning, and Monitoring. A Scientific and Technical Advisory Council helps advise on appropriate research and technical activities, and a liaison office for Chesapeake Bay activities helps coordinate programs from EPA's office in Annapolis.

These committees represent a broad array of expertise: from private individuals; from academic institutions—such as the University of Maryland and the Johns Hopkins University—and from federal agencies such as the National Oceanic and Atmospheric Administration, the U.S. Department of Agriculture, the Environmental Protection Agency, and others.

Memoranda of understanding which outline their responsibilities in the Chesapeake Bay Program have been signed by the EPA and five other federal agencies: the Soil Conservation Service, the National Oceanic and Atmospheric Administration, the U.S. Army Corps of Engineers, the U.S. Geological Survey and the Fish and Wildlife Service. The Corps of Engineers will participate on a project-by-project basis, while the other agencies have made commitments to designate a staff to coordinate Bay projects, to prepare annual work plans and to participate in Bay activities, to serve on the Bay Program's management committees, to coordinate research, monitoring, public education and technical assistance programs through the management committees, and to exchange and transfer research information and data to the Chesapeake Bay Data Center.

As the effort to clean up the Chesapeake Bay continues, this spirit of cooperation will continue, drawing on the energies of private citizens, state and federal agencies and the scientific and academic communities. One plan calls for citizens around the Bay to help with monitoring efforts; another for citizens to advise decision makers through a public participation network.

As Governor Hughes noted at the beginning of this report, Maryland citizens have expressed an active interest in helping with the Bay clean-up effort. Repeated requests have already come from private individuals and businesses for ways in which to help support Maryland's Bay Program. In response to this interest, a plan to mobilize private support and citizen involvement in Maryland is now under consideration. This involvement will further unify the great partnership that exists between the State and its citizens as we all work to restore the nation's most valuable estuary.

"We must continue to see the Bay as an entire system, with problems requiring system-wide solutions."
—Governor Harry Hughes

The Year of the Bay

A groundswell of interest, combined with strong leadership, led to the signing in December, 1983 of a historic regional agreement and, in 1984, the beginning of Maryland's Chesapeake Bay Program.

As a result of their October, 1982 meeting, Maryland's Governor Hughes and Virginia's Governor Robb traveled in June of 1983 to Harrisburg, Pennsylvania to seek the cooperation of Governor Thornburgh. Cleaning up the Chesapeake, they agreed, will take a tri-state effort.

On July 25, 1983, the EPA's William D. Ruckelshaus joined the governors on the Bay to discuss the estuary's pressing problems. Pictured are Virginia Senator Warner, Governor Hughes, Pennsylvania Lt. Governor Scranton, Maryland Senator Sarbanes, Governor Robb, Maryland Senator Mathias, and William Ruckelshaus.

In December of 1983 Maryland, Virginia, Pennsylvania, Washington, D.C. and the Environmental Protection Agency joined together to endorse the cooperative Chesapeake Bay Agreement of 1983. Pictured here are Mayor Barry, Governor Hughes, former EPA head, William Ruckelshaus, Lt. Governor Scranton, and Governor Robb.

By authorizing some $36 million for the Bay Program, the Maryland General Assembly made 1984 the Year of the Bay.

On May 29, 1984, Governor Hughes signed a bill authorizing the start up of Maryland's Chesapeake Bay Program.

Credits

Photography: Skip Brown, cover photograph and pp. 3, 14, 19, 22, 23, 28, 32; Washington Suburban Sanitary Commission, p. 9; K. Gugulis, pp. 10, 13, 21; USDA Soil Conservation Service, pp. 16, 18, 19; Chesapeake Bay Foundation, p. 24; Citizens Program for the Chesapeake Bay, p. 27; M.E. Warren, pp. 29, 32.

Illustration: Al Kettler, p. 2.

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Designer: Sandy Harpe

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STATE OF MARYLAND
CHESAPEAKE BAY INITIATIVES
HIGHLIGHTS OF PROGRESS TO DATE
SEPTEMBER 1985

GENERAL

* We have appropriated a total of $81 million to support our initiatives. This includes $31 million in operating funds (FY 85 - $13.8 million, FY 86 - $17.2 million) and $50 million in capital funds (FY 85 - $22.2 million; FY 86 - 27.8 million).

* We have imposed a moratorium on the taking of rockfish in order to protect and preserve this important fishery.

* We have enacted a ban on the use of phosphates in detergents to help reduce nutrient discharge into the Bay system.

* The Chesapeake Bay Trust has been established to encourage and receive donations from the private sector for grants to citizens organizations for special projects to enhance Bay resources and for public awareness activities regarding Bay restoration efforts. A Board of Directors has been appointed and fund raising activities are underway.

* Industrial enforcement activity has increased dramatically. Seventy-three thousand eight hundred twenty-five dollars ($73,825) have been exacted in civil penalties from 33 industrial discharge cases since January 1985. In addition, there have been a total of 155 enforcement actions against new and existing facilities since the beginning of the year. A recent enforcement action resulted in a fine of thirty-five thousand dollars ($35,000). The schedule of inspections for industrial permit holders, both minor and major, has been revised to require inspection more frequently than in the past.

* With extensive public participation, the Chesapeake Bay Critical Areas Commission developed criteria to guide local officials in limiting future development and in protecting resources along the shoreline areas of the Bay and its tributaries. The public hearing phase of this program is completed and the proposed guidelines are scheduled for action by the General Assembly in January.

* A multi-faceted program to control run-off from agricultural and new development sites has been launched.

REPRESENTATIVE PROGRESS - SPECIFIC INITIATIVES

Point Source Pollution Control

* In the area of municipal sewage treatment plant compliance, significant improvement has been made in the frequency of inspections and related enforcement activities and for the first time financial penalties have been imposed against publicly owned facilities. In addition, Maryland has launched a program which will see 26 municipal industrial wastewater treatment plants adopt pre-treatment measures. Enforcement of these measures is to be effective by September 30, 1985. Pre-treatment programs for Baltimore City, Baltimore County, Anne Arundel County and the town of Hurlock have already been approved. Similar efforts are underway with Harford County, Frederick City, Elkton and Cambridge to establish similar programs. To accelerate this effort, Maryland has implemented a funding assistance program which provides loan and loan guarantees to certain industries for installation of pre-treatment facilities.

* All Maryland sewage treatment plants are scheduled to dechlorinate their wastewater. A grant program is being implemented to fund 100% of the cost of installing chlorine removal equipment in publicly owned sewage treatment facilities.

* State-owned wastewater treatment plants are being given special attention, and substantial upgrading efforts are underway. Construction of major improvements, including

the removal of nitrogen and phosphorus, to the sewage treatment plant at the Maryland House of Correction will begin this fall. Design is underway on improvements to three additional State sewage treatment plants at Bowie State College, Southern Maryland Pre-release Unit and Montrose School, which are scheduled for construction starts during FY 86. The remaining plants, under an expedited schedule, will be funded by fiscal year 1988.

* The State has initiated an innovative and alternative technology program to assist local governments expand the use and improve the performance of on site facilities in areas experiencing septic system failures. These efforts are aimed not only at eliminating the transport of pollutants to the Bay, but also at avoiding the need for the construction of wastewater collection facilities in rural areas not designated for intensive development. During the last year, Maryland has executed four contracts with the St. Mary's, Anne Arundel, Washington and Kent Counties to demonstrate new on site wastewater treatment technologies.

* An aggressive technical training program for water treatment plant operators has been developed with the assistance of a Maryland community college. On site technical assistance is used to address the specific needs of a plant. To date, this assistance has been provided at the Princess Anne, Thurmont and Crumpton sewage treatment plants.

Non Point Source Pollution Control

* The agricultural soil and water conservation initiatives have enjoyed considerable success. Watersheds with the greatest potential for agricultural non point source pollution have been identified and information/outreach efforts are underway in these areas. Technical assistance available to farmers to plan and implement best management practices has also been increased. Over 2,600 applications for cost sharing grants have been received from farmers who want to install plans on their land. To date, over 1,500 request have been approved for a total of $4.8 million. In addition, over 1,100 projects totaling $2.8 million already have been completed.

As part of an effort to increase education, demonstration and research efforts, the University of Maryland and Maryland's Department of Agriculture have developed information materials and established a demonstration farm.

* The State is now enforcing compliance with sediment and erosion control plans for construction sites in 14 counties and a number of municipalities. Ten counties and Baltimore City have been delegated enforcement powers subject to periodic State review. New, tighter State standards for sediment and erosion control plans are being written to improve control techniques and practices. New requirements for prompt stabilization of disturbed earth areas have already been adopted.

* In fiscal year 1985 grants totaling $1,175,000 were awarded to nineteen counties and six municipalities, including Baltimore City, to support local stormwater management programs required by State Law. In FY 86 we anticipate grants of $1.7 million to ensure local implementation of Maryland's relatively new and innovative stormwater regulations. Research to evaluate the effectiveness of conventional stormwater management practices, to develop new techniques and to study recent improvements in stormwater runoff management has been accelerated.

* To control stormwater runoff from existing urban areas, the State Health Department is in the process of making six grant awards totaling some $1 million dollars to local governments for installation of innovative projects.

* Approximately 375 miles of shoreline erode at two or more feet per year. Funds for financial assistance to landowners increased from one (1) to three (3) million dollars in FY 85, enabling the completion of 22 structural erosion projects which protect one and a half miles of shoreline.

Thus far in Fiscal Year 1986, the program has completed nine projects protecting 3,535 feet of shoreline. An additional 55 projects are underway. All told, these projects will protect in excess of three miles of shoreline.

The non-structural shore erosion control program encourages the planting of marsh grass to reduce erosion and sedimentation in slow eroding areas. The Department of Natural Resources is authorized to provide grants to landowners for non-structural shore erosion control projects up to fifty percent of actual project costs. Six demonstration projects have been contracted on state owned lands and one, on Wye Island, has been completed. This fiscal year, approximately 60 non-structural erosion control projects will be completed on private property.

* New State regulations have been proposed specifying plan and approval requirements for agricultural drainage districts to mitigate adverse water quality impacts.

Resources Restoration

* A new program for restoring submerged aquatic vegetation (SAV) envisions a five year planting effort. To date, 50,000 tubers and 10,000 sprigs of wild celery were planted in the Susquehanna Flats area; four pond sites were planted with a variety of SAV species to provide nursery stock for future transplanting work; five SAV test plots were established along the Choptank River to help determine water quality and sediment charactertistics; and a variety of experiments were conducted to determine how Hydrilla verticillata will compete with other more desirable native SAV species.

* The traditional oyster repletion program, spurred by the Bay initiatives, is in high gear. Initiative funding in Fiscal Year 1985 provided funds to increase dredged shell plantings from 150,000 cubic yards to about 300,000 cubic yards and a total of 845 acres of oyster bars were planted. The new funding allowed the purchase and planting of 109,050 bushels of fresh oyster shells to plant a total of 61 acres. An eyed-larvae oyster hatchery at Deal Island has been constructed and will be operational for next season.

* Plans for construction of an intercept hatchery to produce 1.5 to 2.5 million striped bass fingerlings per year are proceeding with the site selection phase now in progress. Rockfish brood stock has been collected and over 11,000,000 larvae shipped to federal hatcheries to be reared and returned to the Bay this fall.

Protection of Land Resources

* Since its establishment in 1984 as part of our Bay Initiatives Program, the Cirtical Areas Commission, charged with formulating criteria for future land use planning in the 1,000 foot critical areas boundary around the Bay and its tributaries has pursued its objective with energy and dedication. The Commission held some sixteen public hearings and conducted several intensive workshops together with forty-eight subcommittee meetings in its deliberations. On August 26, 1985 the criteria were endorsed by a 21-2 vote.

Highlights of the criteria include 1) Development that is to occur in the agricultural and forested areas, identified as Resource Conservation Area by a local jurisdiction, must meet a density of 1 dwelling unit per 20 acres. 2) A 100 foot buffer strip along tidal waters (excluding agricultural drainage ditches and intermittent streams) has been established for the entire critical area. 3) Agricultural activities can be conducted in the buffer provided that best management practices are used and provided that once the criteria are approved, a 25 foot vegetated filter strip is put in place until other equally effective measures are identified and approved. 4) The clearcutting of certain timber is permitted within the 50-100 feet of the 100 foot buffer provided that a buffer managment plan is submitted as part of a forest management plan developed and implemented. 5) Each local jurisdiction can provide for an additional amount in intense or limited development not to exceed 5% of the acreage in the jurisdiction's existing Resources Conservation Area.

In FY 86, the criteria are to be promulgated in final form by the Commission (December 1, 1985) and receive the approval of the General Assembly through a joint resolution, before they can become effective.

In addition, the state has approved fifteen shoreline enhancement grants totaling $1.9 million to local governments in the critical area.

* An extensive program for identification, assessment and monitoring of non-tidal wetlands and training of local government planners in non-tidal wetland identification

and protective practices is underway. To date, wetland inventory maps for all wetlands on the western shore have been digitized and entered into a computer data base; wetland identification training sessions for local governments and consultants have been conducted; two technical assistance publications have been published; Baltimore, Harford, Anne Arundel, and Talbot Counties have established local protection programs affecting thousands of acres of non-tidal wetlands. This fiscal year, the program will digitize all National Wetland Inventory Maps for the Eastern Shore portion of Maryland, and use Landsat satellite imagery at four sties as a monitoring technique.

* In FY 85, activity of the Maryland Environmental Trust resulted in the donation of 1,740 easement acres on Bay property. This included four miles of shoreline, one 300 acre platted subdivision, and several public waterfront parcels in the town of Charlestown. The Trust is currently negotiating with nine property owners to secure easements on an additional 2,500 acres. One thousand additional waterfront acres are under active consideration. Outreach and education activities included the publication of a quarterly newsletter and a trial solicitation mailing with the Chesapeake Bay Foundation to selected waterfront property owners.

* A Twenty-eight forest management plans have been developed on a total of 2,881 acres within the Bay critical area. State foresters are working with local planners to retain forest buffers around waterways.

Resource Enhancement

* The new Maryland saltwater sportfishing license has generated approximately $1,000,000 in new revenues being used for research and monitoring of sportfish stocks, acquisition of fishing piers, and construction and placement of habitat reefs.

* Over the past two summers 1,434 youths at more than 80 locations throughout the State were provided productive employment and career education while involved in Bay planting, shoreline protection, waterfront tree planting, and streambank restoration projects.

* An Office of Water Conservation was established in the State to provide assistance to local governments in planning and implementing water conservation programs. Charles County and the cities of Annapolis and Westminster were provided this service. Regulations were published requiring counties to demonstrate compliance with the State Water Conservation Plumbing Fixtures Act as a condition to State approval of local water and sewerage plans. Studies began focusing on reservoirs in the Potomac and Susquehanna watersheds to determine if freshwater inflows to the Chesapeake Bay could be increased during low flow periods.

Environmental Education Activities

* A key element of the Chesapeake Bay environmental education project has involved preparing Maryland students so that they will continue our vital efforts to protect the Bay. To accomplish this the Maryland State Department of Education has coordinated statewide educational efforts, trained teachers and funded local school programs from the Gunpowder to the Choptank. Through the Chesapeake Bay Foundation we have provided more then 12,000 Maryland students with direct experiences on the Bay and its tributaries.

Monitoring, Research, and Data Management

* The State Health Department has added sixty-six new water quality stations to the Bay water quality monitoring network, including the main Bay and its tributaries, along with a program for analyzing biological indicators of water quality and baseline monitoring of water quality and sediment parameters. The Department of Natural Resources has established living resource monitoring stations in the spawning reaches of the striped bass in the Upper Bay, Choptank and Nanticoke. A monitoring program for oysters will begin this fall. The living resources monitoring project is designed to analyze biological factors with environment and habitat to determine why living resources cannot reproduce and/or survive.

* Bay related research work is being carried out by the State in the following areas: stormwater management techniques, effect of vessel anti-fouling paint on water quality, mathematical modeling of nutrients in the Patuxent River, carbon cycling in the

food chain, transport of nutrients from agricultural lands, managment of Hydrilla, and effects of fishery gear on white perch.

* Perhaps one of the most far reaching initiatives in the Bay program is the establishment of a Regional Data Center. Under this initiative, Maryland supported the purchase of a VAX computer and several other hardware items. A large amount of Bay resource monitoring data has been entered, verified, and stored on magnetic media. State staff have applied their statistical expertise to extensive analysis of data relating key species, such as the striped bass, to habitat and environmental conditions. The primary goal in this activity is to improve the availability of the Chesapeake Bay data base for continued analyses.

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[The attached article prepared by the Environmental Protection Agency currently is being offered to newspapers in the bay area for publication. It summarizes EPA's views of the intergovernmental effort to save the bay.]

> In summer, no place affordth more plenty
> of sturgeon, nor in winter more abundance
> of fowl . . . .
>
> -- Captain John Smith,
> writing about the Chesapeake Bay
> in 1606

> Millions upon millions of people, all throwing
> their problems into the bay. How can it possibly
> survive?
>
> -- James A. Michener,
> writing about the Chesapeake Bay
> in 1978

Two facts seem universally acknowledged about the Chesapeake Bay: It is a national treasure. And its survival is at issue.

For this reason, the states of Virginia, Maryland and Pennsylvania, along with the District of Columbia and the Federal Government have assigned its restoration a top environmental priority. The District and the states in particular are making some truly tough social and economic decisions on behalf of the Bay. The U.S. Government has made a $40 million dollar commitment to it; the states more than twice that amount.

There have been some signs of progress already. It has been reported, for example, that there are signs that rockfish are now making a comeback after a 10-year decline. Still, it is safe to predict that we will continue seeing critical articles and reports about the Bay for a time to come.

That is because the saving of the Bay cannot be properly measured in weeks, months, or even the first few years of the restoration effort. It is a cleanup program of remarkable scope and magnitude, and some problems along the way will be inevitable. Nonetheless, after decades of neglect and abuse of the Bay, the long-needed process of putting life back into it has begun in earnest.

Why is the Bay important? What ails it? And what really is being done about it?

To begin with, the Chesapeake Bay is the nation's largest estuary, with 64,000 square miles of drainage area that in addition to Maryland touches five other states and the District of Columbia. It is the largest blue crab producer in the world and the largest single source of oysters in the nation. In the past, 90 percent of the striped bass harvested on the East Coast have been spawned in the Bay. A foreign visitor to the Bay years ago is supposed to have remarked, "If my country had this, we could feed the world."

The Bay also has attracted all types of human activity over the decades. Today it is home to hundreds of fishermen, as well as many industries, towns, military facilities, boaters, and farmers. The area around the Bay grew by 4.2 million people between 1950 and 1980, an increase of 50 percent. Projected population growth for the year 2000 is an additional 15 percent.

Solving the Bay's problems means striking a delicate balance among these interests. Its immediate problems can be simply stated: pollution from toxics and nutrients.

The major sources of the pollutants are industrial facilities, federal installations, agricultural activity, and municipal sewage treatment plants. There are over 2,750 facilities discharging directly into the Bay. Of equal consequence is pollution from runoff, both urban and agricultural.

The most troublesome toxics in the Bay are those materials that do not quickly deteriorate, instead ending up in the bottom sediment, where they remain a source of pollution. Research shows a direct relationship between elevated levels of toxic compounds in sediments and the decline of individual organisms necessary to a balanced Bay ecology.

Nutrients like phosphorus and nitrogen are the other serious threat to life in the Bay. They encourage the growth of excessive algae which use oxygen and block out sunlight, thereby contributing to significant declines in submerged aquatic vegetation throughout the Bay. The recent loss of this vegetation is unprecedented in the Bay's history. We witnessed the loss of habitat, shelter, and nursery areas for fish and wildlife, and reduced harvests of shellfish and finfish.

Bay nutrients, like toxic pollutants, come from both dischargers and from runoff. For example, the Susquehanna River supplies 50 percent of the fresh water in the Bay. It also contributes 21 percent of the phosphorus load. And 76 percent of that load comes from runoff, mostly agricultural. Previous studies have shown that a year of average rainfall can create runoff accounting for 39 percent of the phosphorus and 67 percent of the nitrogen reaching the Bay.

That is an abbreviated view of the problem, to be sure, but it accurately sketches the job facing governments at all levels and the thousands of private individuals working to save the Bay. Quickly put, the Bay is one of the world's largest and most complex mixtures of ocean and river waters; one which also is vulnerable to polluting activities from the large population surrounding it.

Part of the strategy to regulate toxics involves a program called "pre-treatment." Pre-treatment requires municipal sewage plants to control the type of wastes they receive from industry. Discharging toxics into these plants is undesirable because they cannot neutralize or remove many chemicals, and there are about 900 signifcant commercial facilities that discharge through 56 publicly owned plants around the Bay.

To date, EPA has established standards for this type of toxics-discharge control for 23 of 24 industrial categories. And the remaining standard has been proposed. Of the 900 facilities regarded as significant dischargers, 237 operate under these rules. Most of the others do not generate significant amounts of toxic wastes, and can be handled by the treatment plants.

All industrial facilities are given requirements developed soley by municipalities, the states or EPA which specify the types and levels of wastes that may be discharged, either into a treatment plant or directly into the Bay. Stringent limits on toxic pollutants are now being written into many permits as a result of the Bay initiatives and more demanding national requirements.

The real key to making the permit system work, however, is enforcement. Although violations of permits are fairly common, the majority of these violations are minor. That is why some claims can be made that most Bay permit holders have at some time been in violation of their permits.

What counts, of course, is the identification of serious, recalcitrant polluters. Dischargers with repeated violations are subject to timely enforcement by state agencies or, failing that, by EPA.

That is not to say that enforcement cannot be better. It can improve, and it will.

Bethlehem Steel Corporation is an example of how industry and the Bay can come into conflict -- and the role that enforcement plays. The Bay waters first attracted this large facility near Baltimore and therefore contributed in a sense to the economic benefits it produces in the area. In modern times, the company has been subject, like all companies, to a range of new environmental laws, and it has not always met all of the rules.

In recent years, however, it has spent some $25 million to meet new and increasingly stringent permit requirements, imposed by EPA and the state of Maryland. Those requirements will reduce Bethlehem's permissible discharge of toxic wastes by about 95 percent by July, 1987. Since the issuance of its new permit in 1985, the plant's permit compliance appears to be acceptable on the whole, except for one incident at the beginning of this year for which final corrective action has been scheduled to take place by October.

Nutrients, like toxics, are primarily controlled through regulating discharges and by programs to reduce runoff. As with industrial facilities, each treatment plant operates under a permit defining which pollutants and levels are allowed to be discharged into the Bay. Also like industry, these municipally owned plants are moving into a modern era of environmental protection. In the Bay region, EPA has awarded more than 1,000 grants totalling more than $2.4 billion since 1972 for upgrading sewage treatment.

One nagging example of a polluting treatment plant has been the facility at Easton, Md.

Easton is an older facility in need of improvement, which the state and EPA have sought. The plant is now scheduled to meet tougher discharge standards by 1988 and has received $1.4 million in improvement grants. The problem at Easton involves disinfection and will be resolved when the faciltiy is upgraded.

Nutrient problems cannot be solved totally by upgrading older polluting facilities and enforcing tougher discharge requirements. The problem of runoff -- a major source of nutrient pollution -- must be addressed squarely, despite the fact that it is a much more difficult type of pollution to regulate and control.

Therefore, EPA uses the majority of the $10 million appropriation from Congress each year for grants to the states for controlling pollution from urban and agricultural runoff. The investment in nutrient control for both man-made facilities and runoff already is showing some results. Phosphorus discharges into the Bay have decreased in spite of population increases.

Besides industry, municipal facilities, and agricultural interests, there is one other important source of pollution: federal facilities.

The Department of Defense, for example, maintains over fifty installations around the Chesapeake Bay occupying nearly 400,000 acres and employing in excess of 250,000 personnel.

Aberdeen Proving Grounds frequently is singled out for attention. It is an old installation, and a major facility responsible for military research and development. Aberdeen has signed a formal agreement committing it to an ambitious cleanup initiative.

The Department of Defense signed a joint resolution with EPA in 1984 as part of the Bay cleanup effort. Since 1974 DOD has spent over $180 million for pollution control projects in the Bay region. DOD currently has about 19 such projects under construction as a part of the Bay cleanup effort. The federal facilities "picture" may not be perfect, but it is moving in the right direction.

One cannot, however, measure the effects of everything being done to save the Bay in a single snapshot. The seeds to future success are now being planted by a program that is just three years old.

It is hard to imagine that these efforts will not succeed because the Bay is not without its friends -- millions of them. Maryland, for instance, has banned the use of phosphates in detergents and developed a program for limiting damaging development around the shorelines. Virginia has reduced chlorine discharges from sewage treatment plants and replenished shellfish growing areas. Pennsylvania has given assistance to farmers who control soil loss in certain areas, as have Maryland and Virginia. The District of Columbia has dramatically improved treatment at its Blue Plains treatment plant. In addition, citizens groups, the states and EPA continue to take polluters to court -- and win.

Over a decade ago, a great body of water was found to be endangered from the by-products of modern civilization. The federal government, states and citizens banded together. The critics pointed fingers, underscored problems with their program, and pronounced Lake Erie dead.

Today, years later, Lake Erie is far from perfect, but it is on the road back to good health, proving that great bodies of water can be revived with resources and commitment. Fortunately, the Bay has both of these essential elements on its side. With a little patience, better days await it.

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